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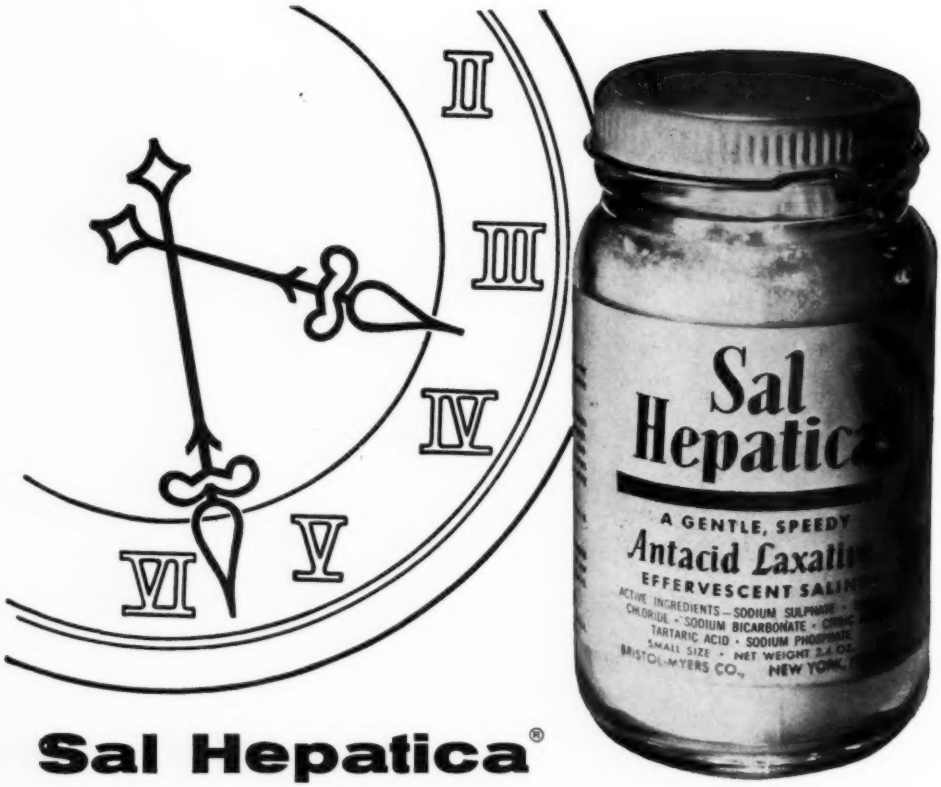

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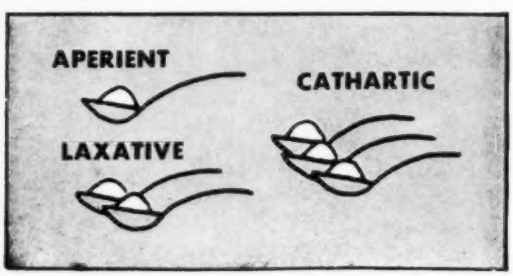

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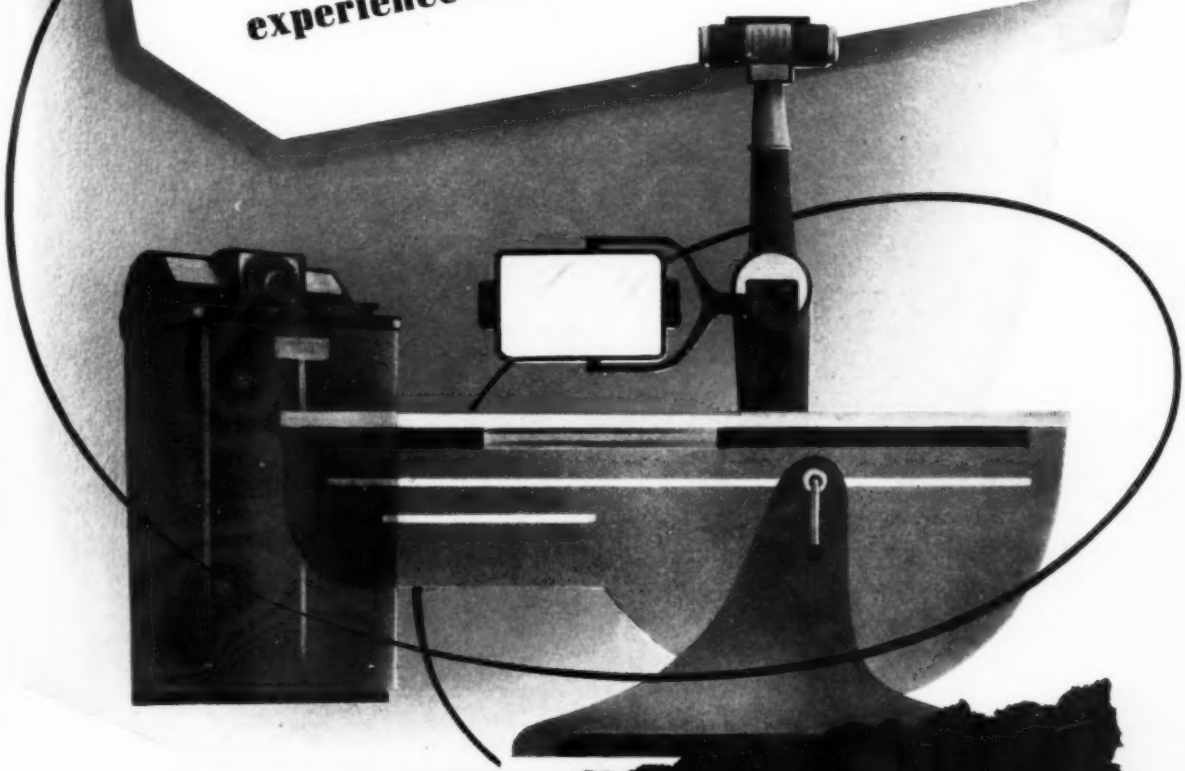

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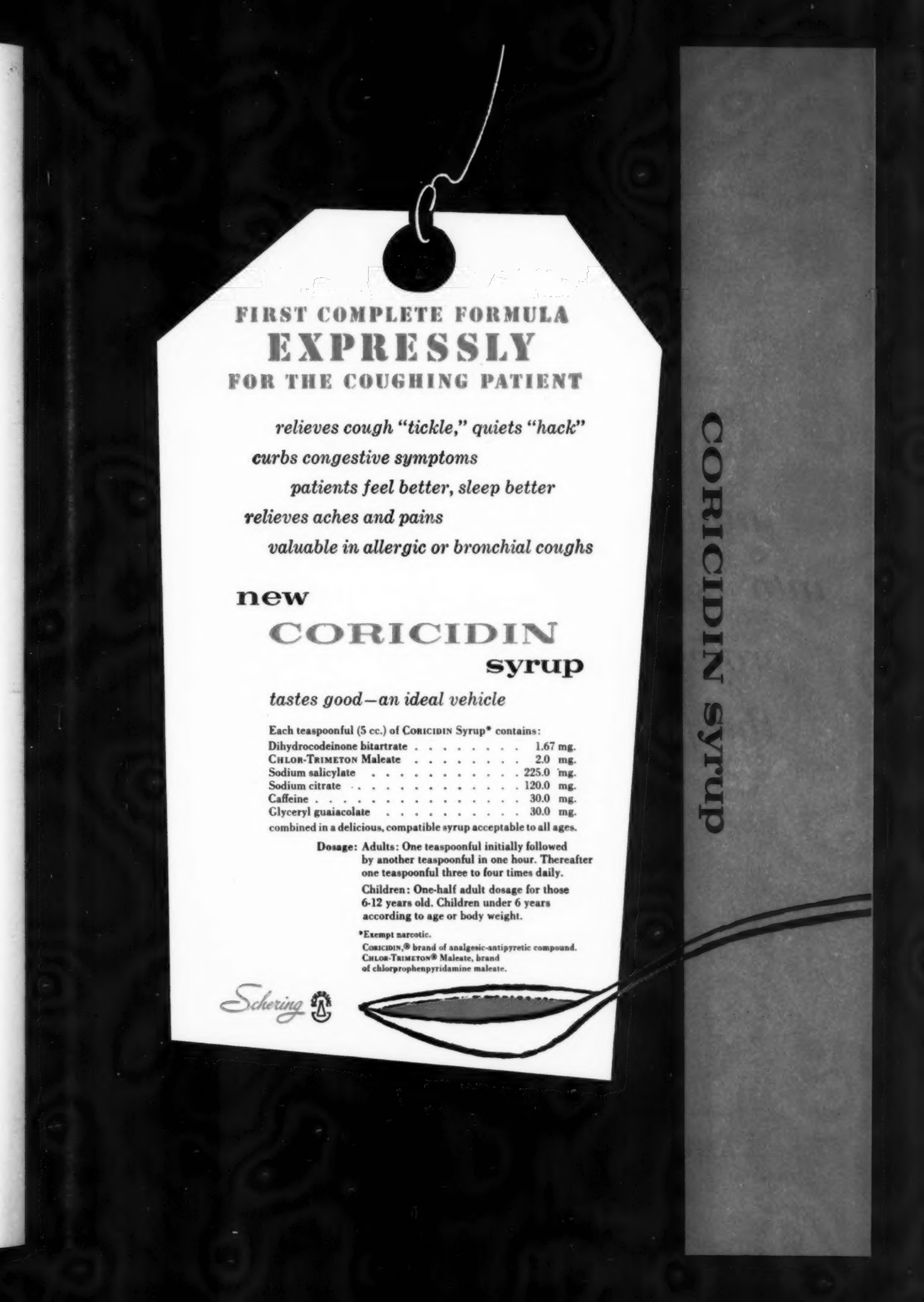
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2. Sebrell, W.H., Jr.: Trends and Needs in Nutrition, J.A.M.A. *152*:42 (May 2) 1953.
3. Nutrients Available for Consumption per Capita per Day, 1909-1948, United States Department of Agriculture, Miscellaneous Publication 694, 1949.
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5. Flour and Bread Enrichment, 1949-50, The Committee on Cereals, Food and Nutrition Board, National Research Council, 1950.
6. Sherman, H.C.: The Nutritional Improvement of Life, New York, Columbia University Press, 1950, pp. 86-87.

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[1] J. A. M. A. 152:1676 (Aug. 22) 1953.
[2] J. A. M. A. 151:964 (Mar. 14) 1953.
[3] J. A. M. A. 152:585 (June 13) 1953.
[4] A. M. A. Arch. Int. Med. 90:677 (Nov.) 1952.
[5] J. A. M. A. 149:762 (June 21) 1952.
[6] A. M. A. Arch. Int. Med. 90:763 (Dec.) 1952.
[7] A. M. A. Arch. Int. Med. 90:677 (Nov.) 1952.
[8] J. A. M. A. 144:519 (Oct. 14) 1950.
[9] J. A. M. A. 142:1133 (Apr.) 1950.
[10] A. M. A. Arch. Dermatol. & Syphil. 67:173 (Feb.) 1953.
[11] Eye, Ear, Nose & Throat Monthly 31:647 (Dec.) 1952.
[12] Antibiotics & Chemotherapy 3:314 (Mar.) 1953.
[13] Am. J. Surg. 86:628 (Nov.) 1953.
[14] Delaware State Med. J. 25:55 (Mar.) 1953.
[15] J. A. M. A. 154:1392 (April 17) 1954.
[16] A. M. A. Am. J. Dis. Children 85:675 (June) 1953.
[17] A. M. A. Am. J. Dis. Children 84:757 (Dec.) 1952.
[18] Ann. Allergy 11:535 (Sept.-Oct.) 1953.
[19] New York State J. Med. 54:231 (Jan.) 1953.
[20] Med. Times 80:666 (Nov.) 1952.

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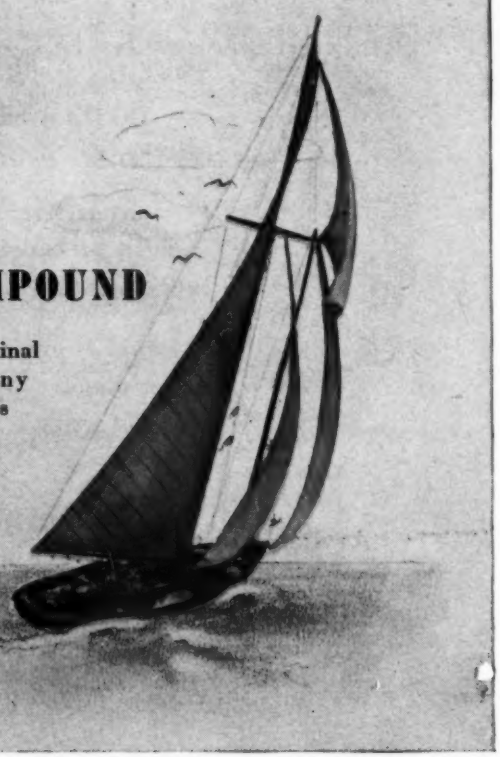

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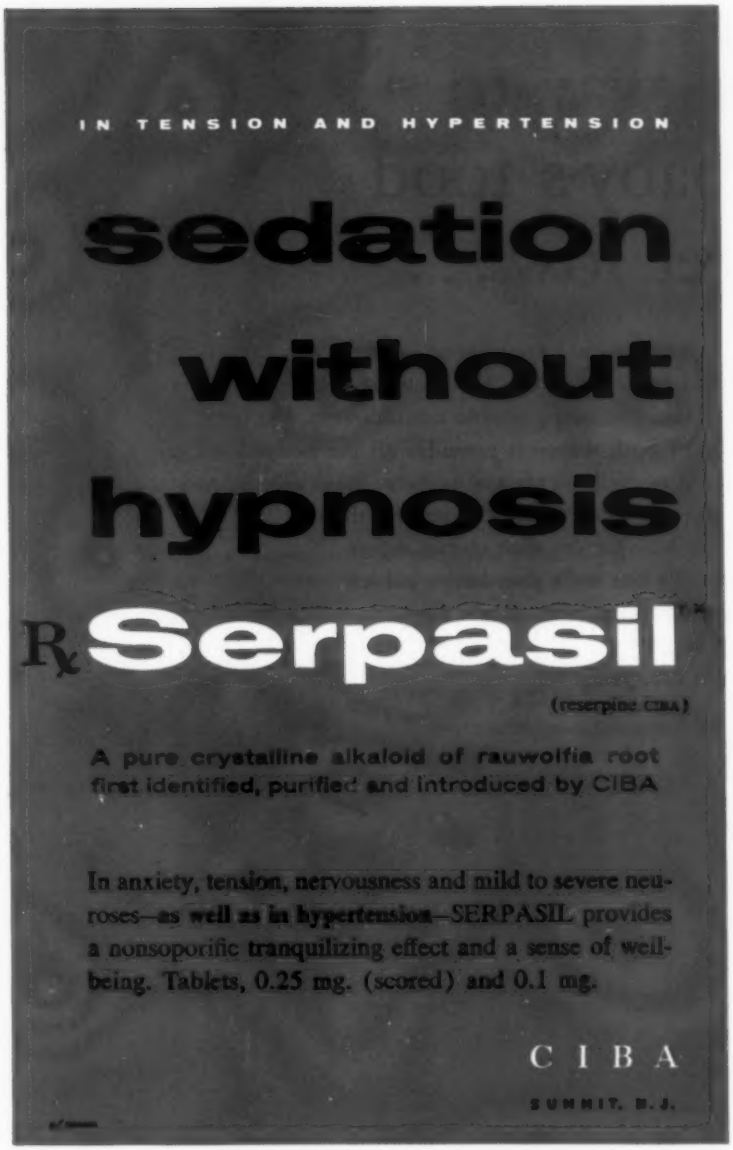
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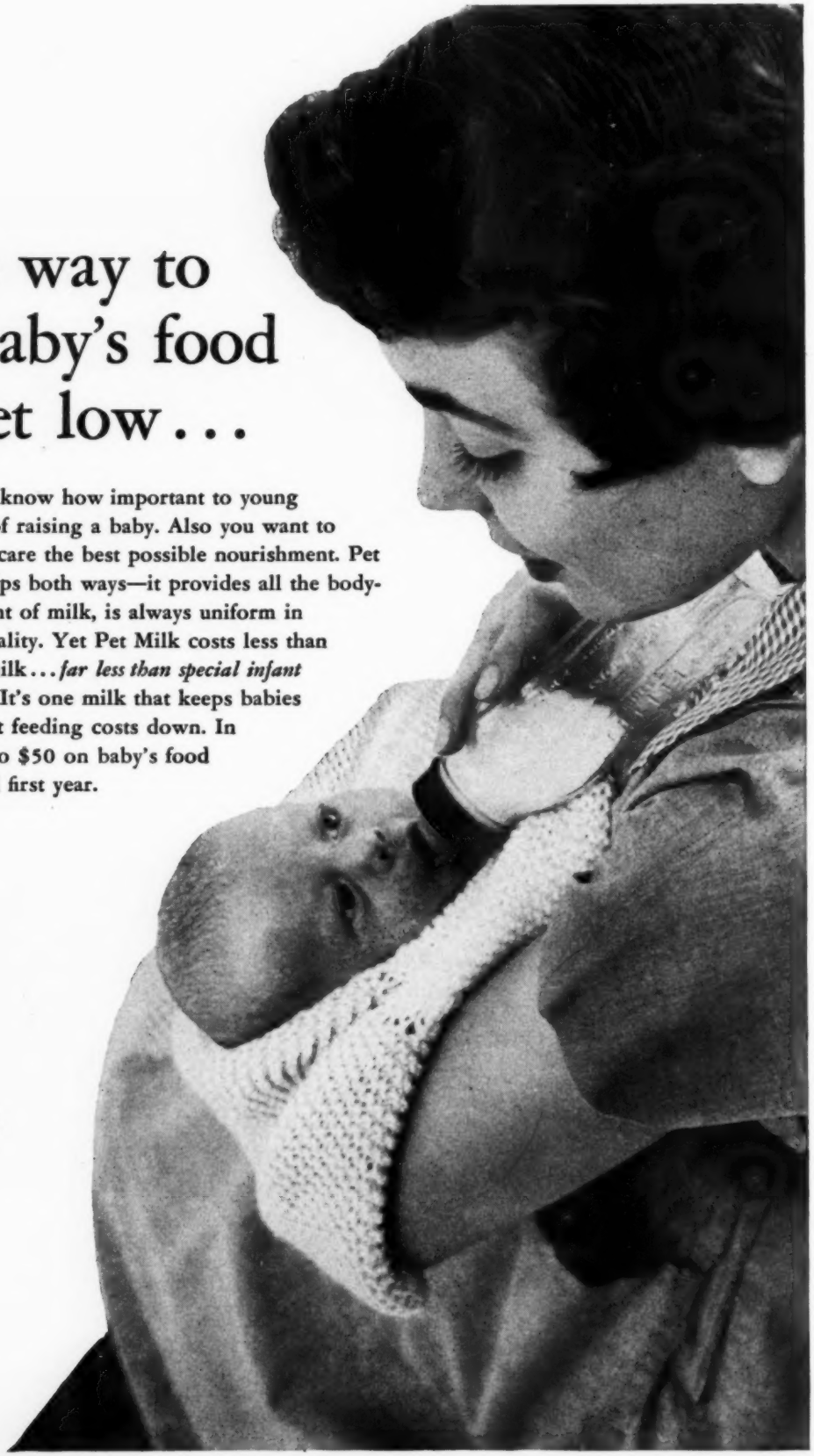

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*Smith, R. T., New York Med. 8:16, 1952.

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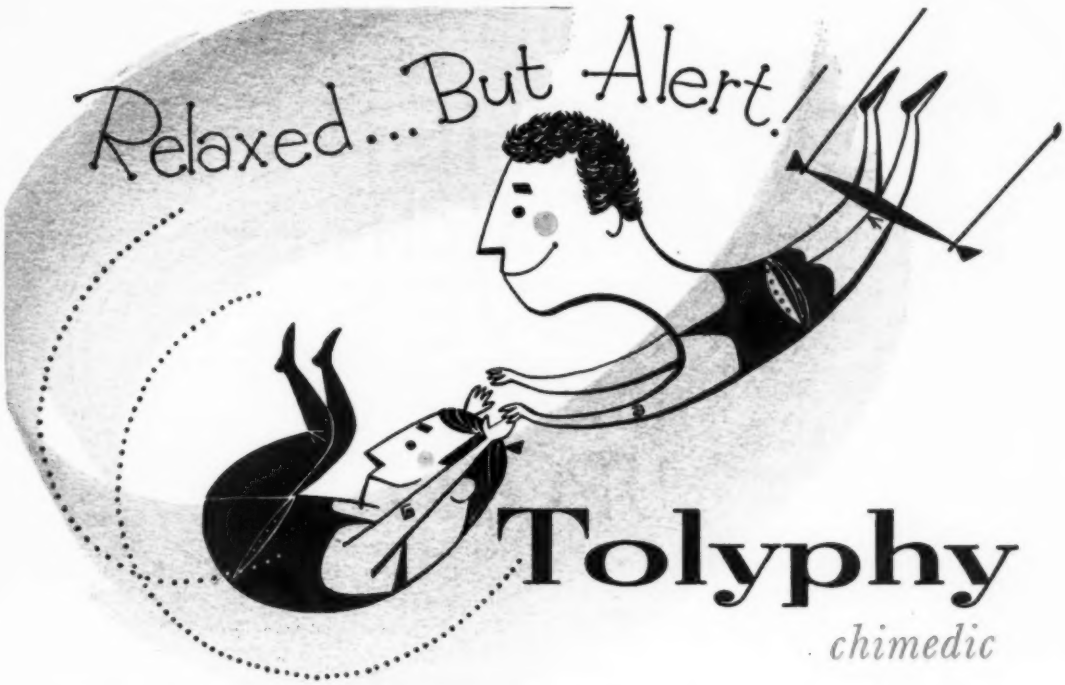

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References: 1. Jackson, M. G.: Lancet 2:346 (Aug. 15) 1953. 2. Gamble, C. J.: Ann. New York Acad. Sc. *54*:840 (May 2) 1952. 3. Greenhill, J. P.: Office Gynecology, ed. 5, Chicago, The Year Book Publishers, Inc., 1948. 4. Novak, E.: Textbook of Gynecology, ed. 3, Baltimore, The Williams and Wilkins Co., 1948. 5. Reich, W. J., and Nechtow, M. J.: Practical Gynecology, Philadelphia, J. B. Lippincott Co., 1950. 6. Council on Pharmacy and Chemistry of the A.M.A.: New and Nonofficial Remedies for 1954, Philadelphia, J. B. Lippincott Co., 1954. 7. Tietze, C.; Lehfeldt, H., and Liebmann, H. G.: Am. J. Obst. & Gynec. *66*:904, (Oct.) 1953. 8. Finkelstein, R.; Guttmacher, A., and Goldberg, R.: Am. J. Obst. & Gynec. 63:664 (March) 1952. 9. Barnes, J.: Lancet 2:401 (Aug. 22) 1953.

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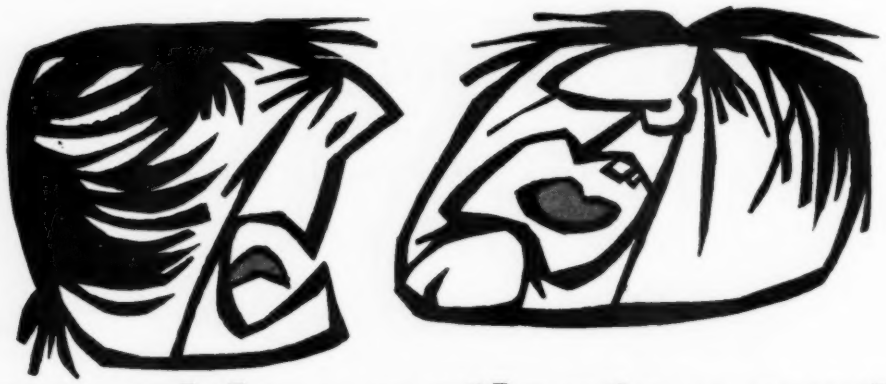

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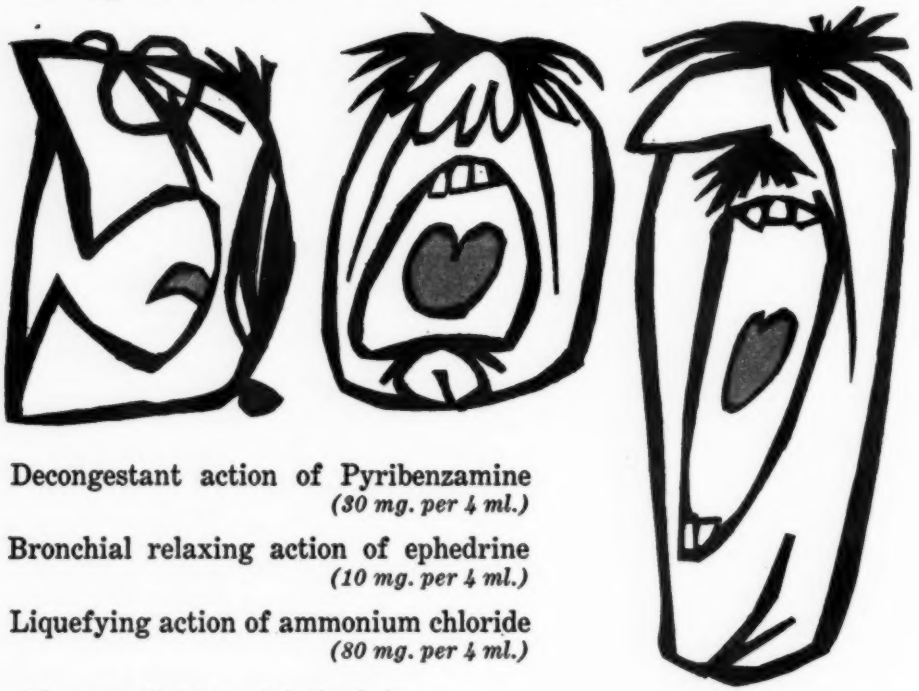

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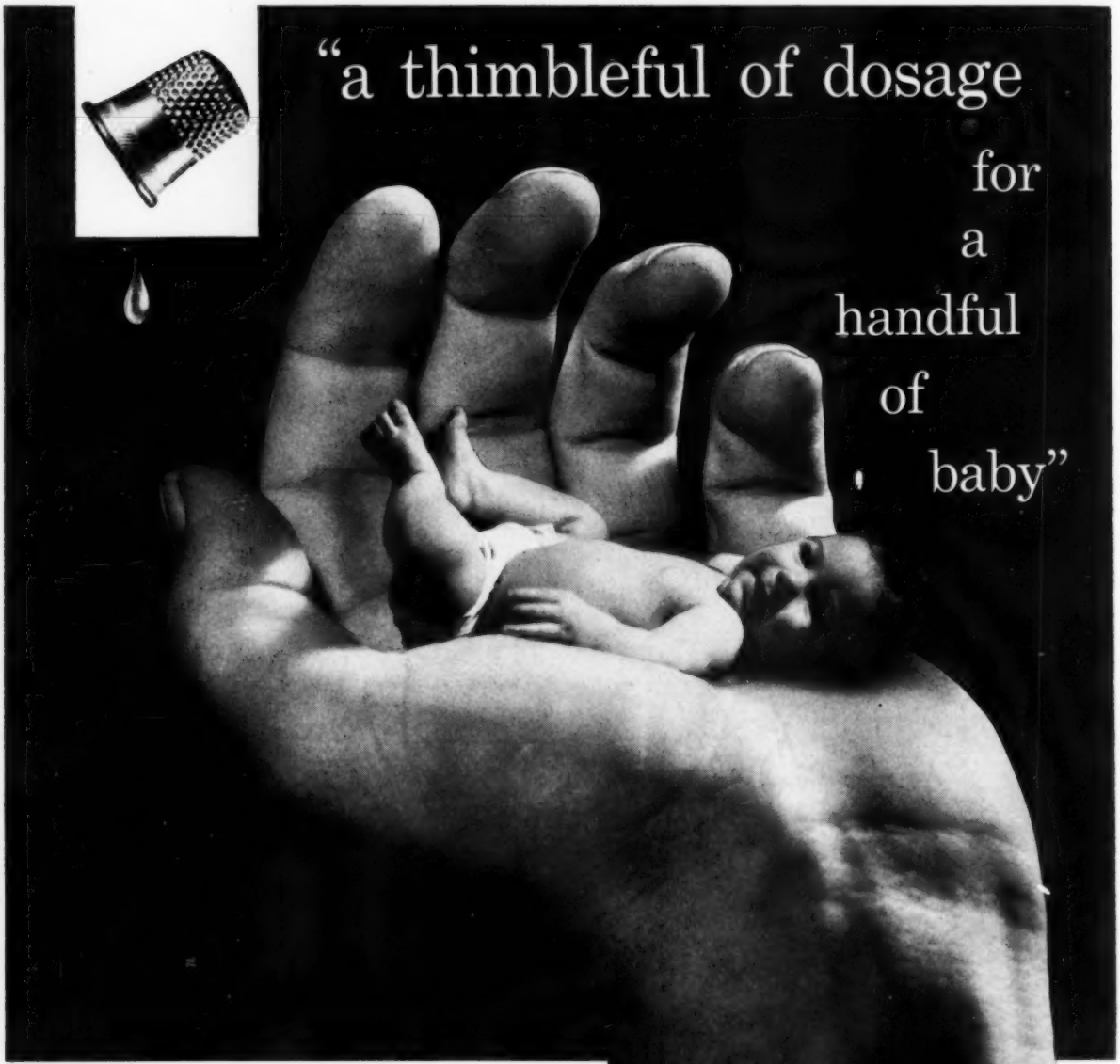

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The Journal of the American Osteopathic Association

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Surgical Issue—II

A Survey of 20,000 Cases of Surgical Pathology

NORMAN W. ARENDS, D.O.
Huntington Woods, Mich.

INTRODUCTION

Surveys of surgical pathology of a formal or informal nature in complete or partial form have been carried on for years. The purposes of the surveys have also been many and varied. As pathologist of the Detroit Osteopathic Hospital, I began an informal survey of an incomplete nature immediately upon establishing a Department of Pathology 9 years ago. This was done because of a sincere desire to call the attention of the staff, and especially of the Department of Surgery, to mistakes being made. This proved to be very educational to the staff, to the surgeons, and to the pathologist.

Gradually, with growth of the hospital, there developed a demand from many quarters for a formal and more complete report. This demand was given impetus by public alarm over fee-splitting, unnecessary surgery, and by the poor showing of some of the hospitals for which the department was doing tissue examination. Finally, the idea was molded into a practical form through the efforts of Dr. Ralph Lindberg, Medical Superintendent, and many of the members of the staff. This survey was begun in 1953.

METHOD OF SURVEY

To cover all fields was impractical. It was, therefore, decided that the survey would cover the field of general surgery, specifically surgery of the appendix, the gallbladder, the uterus, the uterine tubes, and the ovaries. All cases involving the removal of one or more of these viscera as a matter of surgical expediency in the treatment of some other disease were excluded whenever possible by a review of the case record. Diagnoses were shortened and standardized wherever possible to prevent the statistics from becoming too bulky; for instance, a case of carcinoma of the ovary was recorded under ovarian pathology, and a small myoma of the uterus in the same individual was ignored and not recorded. Likewise, some diagnoses made by our associate, Dr. Otterbein Dressler, were altered in those instances in which opinions did not perfectly coincide in order that the figures would represent a constant. Hospitals were given alphabetical designations and, in all cases, the pathology was recorded as major, minor, or normal. By this means, 20,000 cases of all types of surgical pathology, over a period of 1½ years, were screened. Actual numbers of cases under each heading were determined and percentages calculated.

THE APPENDIX

Table I is a classification according to pathology of appendices. Major pathology was considered to be acute inflammation with or without complication, endometriosis, carcinoid, mucocele, oxyuriasis, lymphoid hyperplasia with evidence of local or hematogenous infection, acute suppurative attack of chronic recurrent appendicitis, carcinoma, tuberculosis, and the like.

Minor pathology included chronic appendicitis, chronic lymphoid appendicitis,[1] lymphoid hyperplasia without evidence of local or hematogenous infection, appendices showing fecal stasis, Lane's bands, and neuroma.

The term "normal tissue" was used to indicate those appendices showing no anatomic variation and those showing only metabolic fibrosis.

A few comments need to be made concerning those disease processes listed as major pathology: Lymphoid hyperplasia and the size of the lumen are important factors in the pathogenesis of appendicitis.[2] It is true that other disease processes such as the acute exanthemata produce general lymphoid hyperplasia. I feel that characteristic histologic features are present, however, in intrinsic infection of the appendix. Since this then represents the earliest phase of acute appendicitis, this group was included.

Oxyuriasis will not be recognized by some as a major pathology. In fact, some authorities[3-5] dismiss it as an insignificant infestation. It is my belief, with others,[6] that the parasite traumatizes the mucosa, and secondary bacterial invasion follows. This belief is strengthened by the frequent finding of the worm in an acutely inflamed appendix and by the intense degree of lymphoid hyperplasia in mesenteric nodes as well as

*The articles included in this Surgical Issue—II were presented at the Twenty-Seventh Annual Clinical Assembly of the American College of Osteopathic Surgeons, Dallas, Texas, October 31-November 4, 1954. See Editorial pages for additional information.

TABLE I—CLASSIFICATION OF APPENDICEAL FINDINGS

Normal	Minor Pathology	Major Pathology
1. Without pathology	1. Chronic appendicitis	1. Acute inflammation (with or without complication)
2. Metabolic fibrosis	2. Lymphoid appendicitis	2. Endometriosis
	3. Lymphoid hyperplasia (without evidence of infection)	3. Argentaffinoma (carcinoid)
	4. Fecal stasis	4. Mucocele
	5. Lane's bands	5. Oxyuriasis
	6. Neuroma	6. Lymphoid hyperplasia (with evidence of local or hematogenous infection)
	7. Inflammatory fibrosis	7. Chronic appendicitis with acute suppurative attack)
		8. Carcinoma, tuberculosis, etc.

in the appendix in some instances. Certainly, the parasite produces the typical symptoms of acute appendicitis.[1] In view of these features, other complications,[7] and sociologic features,[8] this parasitism was classed as major pathology.

The listing of chronic recurrent appendicitis as minor pathology may be criticized. This criticism must take into account, however, that the acute exacerbation, or acute suppurative attack, has been listed as major pathology. It seems logical that the appendix of the adult should indeed bear scars of previous bouts of inflammation. What body tissue has not been involved by infection or inflammation sometime during life? These scars and minor inflammatory cell infiltrations seen by the pathologist may or may not be reflected as symptomatology. In fact, some pathologists[9] feel that chronic recurrent appendicitis is not a disease entity at all. A more conservative attitude recognizes that symptomatology may be relieved by appendectomy and that perhaps scarring produces distortion of nerve supply. Just because the exact mechanism of the symptomatology is not understood does not mean that it does not exist. It is my belief that there are minor pathologies which may be classified as chronic appendicitis.

Fecal stasis may represent colonic dysfunction rather than intrinsic appendiceal pathology. It was, however, listed as a minor pathology. Lane's bands and alterations in the length or status of the mesoappendix were listed as minor pathology, since their complications obviously placed them immediately in the major category. These distortions, we believe, might well alter peristaltic movements and produce symptomatology and periodic obstructions and scarring.

The term "normal" needs no explanation. Appendiceal fibrosis of a metabolic nature has been found to be a normal process going on at varying rates of development in different individuals (Table II). The consensus is that there is no symptomatology.

TABLE II—OBLITERATION OF APPENDIX[10] (Metabolic Fibrosis)

Age in Years	Percentage of Obliteration Found
1 to 10	4
10 to 20	11
20 to 30	17
30 to 40	25
40 to 50	27
50 to 60	36
60 to 70	53
70 to 80	58

Table III represents the record of various hospitals. It can be seen at once that some hospitals have a very high percentage of minor pathology and normal appendices. All show some normal appendices. Is that right and good? All show a fair percentage of minor pathology. Is that right and good? It would seem to the author that a small percentage, perhaps 3 to 5 per cent, should be found to be normal. An absence of at least a few normal ones would raise concern as to whether the surgeons were so conservative that they were allowing appendices to rupture or become gangrenous before operating. This would lead to morbidity and mortality which would be far more deplorable than the occasional removal of a normal appendix.

It would seem that a percentage of 35 to 45 per cent of minor pathology would be consistent with good laboratory and clinical investigation of cases. When one considers the multitude of disease processes that can produce abdominal pain or discomfort, especially in children, certainly all cases of abdominal discomfort deserve more than a snap diagnosis.

TABLE III—THE APPENDIX

Hospital	Percentage of Normal Appendices	Percentage of Minor Pathology	Percentage of Major Pathology
A	9	46	45
B	4	60	36
C	6	55	39
D	7	52	41
E	6	49	45
F	2	59	39
G	10	61	29
H	12	66	22
I	7	18	75
J	10	52	38
K	6	55	39
L	6	48	46
M	6	54	40
N	14	46	40
O	13	40	47
P	4	60	36
Q	....	....	....
R	7	54	39
S	12	48	40
T	....	40	60
U	14	54	32

The records of some of the above hospitals indicate that insufficient time and study are being given cases of abdominal distress and that the very unscientific and very questionable moral attitude is present in which it is felt that, regardless of the disease process, removal of the appendix creates little harm. Of the two, I would judge that lack of experience and/or training is of greater prominence, for, over the years, we have found marked changes in habits of hospitals which have been offered pathologic consultation. It would therefore seem that better education, less hurry, and more careful study might well improve the records

TABLE IV—CLASSIFICATION OF GALLBLADDER FINDINGS

Normal	Minor Pathology	Major Pathology
1. No pathology	1. Cholesterol imbibition	1. Acute inflammation (with or without complications
	2. Chronic inflammation (minimal inflammatory sprinkling without scarring)	2. Cholelithiasis
	3. Evidence of increased intracystic pressure	3. Mucocele
		4. Empyema
		5. Chronic inflammation (with scarring)
		6. Carcinoma

of many of these hospitals. It is my opinion that frank greed is the exception rather than the rule.

GALLBLADDER

Major gallbladder pathology (Table IV) was considered to be acute inflammation with or without complications, cholelithiasis, mucocele, empyema, carcinoma, or chronic inflammation with distinct thickening of the wall.

Minor pathology included cholesterosis, or, if preferred, cholesterol imbibition, and chronic inflammation of the gallbladder with light inflammatory cell sprinkling throughout the wall, but without marked scarring or fibrous thickening. In addition, those gallbladders showing very markedly increased intracystic pressure with very prominent Rokitansky-Aschoff sinuses were included under this classification.

The term "normal tissue" was used to indicate those gallbladders showing no evidence of increased intracystic pressure, inflammation, or change in metabolic activity.

This classification of diseases of the gallbladder into major and minor pathology requires little, if any, explanation.

TABLE V—THE GALLBLADDER

Hospital	Percentage of Normal Gallbladders	Percentage of Minor Pathology	Percentage of Major Pathology
A	....	14	86
B	2	4	94
C	2	10	88
D	3	15	82
E	....	6	94
F	2	10	88
G	2	27	71
H	14	58	28
I	....	33	67
J	13	61	26
K	10	21	69
L	....	....	100
M	1	5	94
N	....	29	71
O	2	50	48
P	25	50	25
Q	....	....	100
R	3	39	58
S	14	14	72
T	....	50	50
U	....	....	100

The surgeon, in the evaluation of the gallbladder, has a valuable ally in the radiologist. Certainly, the radiologic findings are relied upon in many instances, especially in the presence of gallstones. The very excellent records of many of the hospitals, as indicated in Table V, support the truth of this statement. Certainly, metabolic disturbances, as reflected by cholesterosis, should be represented by a small percentage. The table indicates that this is true. It is obvious, however, that many of the hospitals fall far below these good records and that some show a relatively high percentage of minor pathology and too high a percentage of normal gallbladders. Lack of experience and training rather than commercialism may also be reflected in these figures.

This is undoubtedly due to poor understanding of the physiology of the gallbladder and liver as well as to improper radiologic examination. If nonfunction of the gallbladder, upon routine radiographic examination of the gallbladder, is accepted as the criterion for surgical removal, then the reason for a poor record at once becomes obvious. The surgeon requires the aid of the laboratory in the differential diagnosis of infectious hepatitis, the various forms of cirrhosis of the liver, chronic congestive states of the liver such as occur in congestive heart failure, and neoplasms of the liver.

The second factor that must be considered is the failure to recognize the limitations of radiologic examination. It is the procedure in the Department of Radiology at the Detroit Osteopathic Hospital to prepare the patient scrupulously the night before and then administer Telepaque. If the gallbladder is found to be nonfunctioning, the patient is again prepared, Teridax administered, and another examination made before a report of nonfunctioning gallbladder is released. Too few individuals know that even the drinking of a Coca Cola or other soft drink after the administration of the dye may produce emptying of the gallbladder with nonvisualization the following day. It is our definite opinion that removal of a gallbladder cannot be performed without severe criticism unless radiologic evidence is at hand or unless the symptoms are those of an abdominal crisis. We do not believe that the removal of a gallbladder should be based upon vague upper abdominal symptomatology, and we believe that some of the records of the hospitals support this opinion.

THE UTERUS

Major pathology of the uterus (Table VI) was considered to be carcinoma, large myomata or fibroids, adenomyosis, parametrial endometriosis, extensive polypoid hyperplasia of the endometrium, matting and deforming adhesions, and procidentia in which laboratory evidence of descensus uteri was marked by elongation of the fibromuscular ring of the cervix, hypertrophy of the portio vaginalis with coarsening of the epidermis, and the development of wrinkled, skinlike qualities, pelvic inflammatory disease, tuberculosis, and the like.

Under minor pathology were classified such lesions as solitary endometrial polyp, extensive cervical erosion, small myomata or fibroids of the uterus without evidence of degeneration or hemorrhage, para-

TABLE VI—CLASSIFICATION OF UTERINE FINDINGS

Normal	Minor Pathology	Major Pathology
1. No pathology	1. Solitary endometrial polyp	1. Carcinoma
2. Pregnant (undelivered or with incomplete abortion)	2. Massive cervical erosion	2. Myomata (large and complicated) or fibroids
	3. Few and small myomata or fibroids (uncomplicated)	3. Adenomyosis
	4. Few parauterine adhesions	4. Parametrial endometriosis
	5. Procidentia (no anatomic cervical changes)	5. Polypoid hyperplasia (of marked extent)
	6. Fibrosis uteri	6. Procidentia (with cervical changes)
		7. Extensive adhesions
		8. Pelvic inflammatory disease
		9. Tuberculosis, etc.

uterine adhesions of a light nature, procidentia supported by chart evidence rather than anatomic uterine changes, and so-called fibrosis uteri or static myometrial hyperplasia.

The term "normal" was used whenever a uterus was found to meet average normal measurements and to show normal configuration and, perhaps, products of conception. In the review of the pathology of the uterus, those cases were selected in which the tubal or ovarian pathology was of less significance. Thus, if the uterus appeared to be relatively normal except for adhesions, but had two retort-shaped tubes adherent to it, the case was recorded under tubal pathology, and the relatively normal uterus, or the uterus showing only minimal pathology, was not added to the figures of uterine pathology.

TABLE VII—THE UTERUS

Hospital	Percentage of Normal Uteri	Percentage of Minor Pathology	Percentage of Major Pathology
A	5	5	90
B	12	26	62
C	3	21	71
D	7	21	72
E	15	21	64
F	14	21	65
G	20	26	54
H	10	45	45
I	33	8	59
J	33	17	50
K	16	20	64
L	....	....	100
M	4	10	86
N	22	29	49
O	12	12	76
P	....	63	37
Q	13	13	74
R	19	22	59
S	....	18	82
T	20	6	74
U	....	....	100

The records of various hospitals vary enormously concerning uterine pathology (Table VII). It is at once obvious that the surgeon cannot be perfect, and that an occasional normal uterus may be removed in which adenomyosis or some other pathology has been suspected. However, the record of several of the hospitals showing 20 to 30 per cent normal uteri can certainly not be explained on the basis of occasional error. All too frequently these uteri are sent to the laboratory with the diagnosis of fibrosis uteri or endometritis. Again it appears that lack of understanding of various disease processes is an important factor.

Fibrosis uteri is a distinct clinical entity. It is now termed "static myometrial hyperplasia." The frequency of this disease process, or uniform symmetrical enlargement of the uterus, is low. We are of the opinion that minor variations in size of the uterus can well be accounted for by individual differences, malpositions, and hormonal disturbances which are most frequently of a temporary nature. The true case of static myometrial hyperplasia in which the weight of the uterus is greatly in excess of 120 grams is a relatively rare lesion.[11]

The same is true of acute or chronic endometritis. It is certainly infrequent in this day of treatment of gonorrhea with antibiotics to find acute gonococcic endometritis. Certainly, we see the disease no more than once in every 2 or 3 years, despite our very large volume of surgical pathology. True chronic endometritis is also a rare lesion. We do not have accurate statistics but we have the general impression that we see no more than three or four cases of true infection, or chronic endometritis, in a year's time. Therefore, the surgeon who repeatedly uses the diagnosis of fibrosis uteri or chronic endometritis at once admits his lack of understanding of gynecologic pathology. This admission, unfortunately, is all too frequent.

UTERINE TUBES

Major pathology of the uterine tubes (Table VIII) was considered to be ectopic pregnancy, infection with alteration in form or shape and in the patency of the lumen, distortion by tumor, hydrosalpinx, hematosalpinx, distortion by endometriosis, and tubes obviously interrupted and deformed by previous ligation.

Minor pathology included infection, either acute or chronic without distortion of the luminal patency, minor adhesions, and very large cysts or hydatids of Morgagni producing some distortion of the tubal lumen.

Normal tubes were those which showed no evidence whatever of infection, tumor, or change in size, in shape, or in patency.

Excluded from the above statistics were all cases of tubal ligation in which there was chart evidence that medical, psychiatric, or obstetric reason for prevention of pregnancy had been established by able consultants. Elective salpingectomy was not considered a valid reason, and all such uterine tubes, if normal, were classified as such.

Table IX shows that there is a marked disregard for the preservation of the uterine tubes. In some hospitals an extremely high percentage of normal uterine tubes and a relatively high percentage of uterine tubes exhibiting but minor distortion or pathology are removed. The figures are affected by the

TABLE VIII—CLASSIFICATION OF UTERINE TUBE FINDINGS

Normal	Minor Pathology	Major Pathology
1. No pathology	1. Infection (without disturbance of patency)	1. Ectopic pregnancy
	2. Adhesions	2. Infection (with alteration of shape and patency of lumen)
	3. Embryonal cysts (producing distortion of lumen)	3. Tumor
		4. Hydrosalpinx
		5. Hematosalpinx
		6. Endometriosis
		7. Interruption (by previous ligation)

failure of some surgeons to treat acute salpingitis with antibiotics. It also reflects the failure of many surgeons to realize the extent of individual variation in the size of uterine tubes and the variation in vascular supply at different times during the menstrual cycle. We believe the figures reflect the great pressures placed upon physicians and surgeons by the public for the control of pregnancy. Again, however, education appears to be much needed.

TABLE IX—THE UTERINE TUBES

Hospital	Percentage of Normal Tubes	Percentage of Minor Pathology	Percentage of Major Pathology
A	60	4	36
B	23	8	69
C	70	5	25
D	25	10	65
E	27	10	63
F	34	17	49
G	35	16	49
H	....	....	100
I	67	....	33
J	85	....	15
K	25	....	75
L	....	....	100
M	4	6	90
N	27	5	68
O	....	33	67
P	....	....	100
Q	....	....	100
R	20	25	55
S	20	....	80
T	35	....	65
U	....	....	100

THE OVARIES

Major pathology in the ovary (Table X) comprises all tumors of considerable size (especially malignant ones), endometriosis (whether extensive or not), marked distortion of the ovary by extensive adhesions with or without cyst formation, abscess, and non-neoplastic cysts of such proportion as to suggest disturbance of the ovarian blood supply.

Minor pathology was considered to be hemorrhage from ruptured graafian follicles, adhesions without major distortion of the ovarian surface, and cysts which were of such size that they could be ruptured or removed without major interference with the ovarian blood supply.

Normal ovary was used as the designation for entire ovaries or portions of ovary showing normal structures. These normal structures included corpora hemorrhagica, corpora lutea, involuting corpora lutea, and graafian follicles at the upper limits of normal.

The criteria established above might be criticized. Therefore, I will review briefly the physiology of the ovary in an effort to establish my position. The ovary of the newborn contains some 200,000 primordial follicles. After the menarche, each month groups of follicles develop into secondary and graafian follicles until one of the graafian follicles gains ascendency. The other follicles may be very close in size to that graafian follicle which contains the select ovum of the month. Thus, the ovary, when inspected at this time, will show a multicystic pattern with one follicle larger than the others and approaching the maximum size of 1.5 cm. This follicle then ruptures through a rent in the cortex known as the stigma, with extrusion of the liquor folliculi out upon the surface of the ovary. This liquor is high in protein, and delicate adhesions may well develop about this defect. It is believed that the granulosa cells become modified to lutein cells. Thereafter, vascularization occurs with the development of thin-walled blood vessels. These often open into the collapsed cavity and fill it, at least partially, with blood. Gradually then, lutein cells proliferate, and the corpus hemorrhagicum, with the phagocytosis of blood cells, becomes a mature corpus luteum which measures at least 1.5 cm. in diameter. This mature corpus luteum is yel-

TABLE X—CLASSIFICATION OF OVARIAN FINDINGS

Normal	Minor Pathology	Major Pathology
1. No pathology	1. True cysts (non-neoplastic)	1. Tumor
2. Graafian follicles (less than 1.5 cm. diameter)	2. Few and fine adhesions	2. Endometriosis
3. Corpora lutea (less than 2.5 cm. diameter without hemorrhage into peritoneum)	3. Hemorrhage into peritoneum from ruptured graafian follicles	3. Abscess
4. Corpora lutea vera		4. Extensive adhesions (with or without cyst formation)
		5. Pregnancy, etc.
		6. Non-neoplastic cysts affecting blood supply

low to orange-yellow in color. The full name of the mature corpus luteum should include the designation which indicates whether it is that of menstruation or pregnancy. If it is the corpus luteum of menstruation, then involution begins. The carrot-yellow color may remain for a matter of months, and a single ovary may show two or three of these involuting, or regressing, corpus lutea; finally, scarring occurs with the development of a corpus albicans. In pregnancy, the corpus luteum further continues to enlarge and may make up even as much as a third of the ovarian size. In this state, it is cystic.

TABLE XI—THE OVARIES

Hospital	Percentage of Normal Ovaries	Percentage of Minor Pathology	Percentage of Major Pathology
A	63	5	32
B	37	2	61
C	56	8	36
D	40	14	46
E	56	9	35
F	52	20	28
G	68	3	29
H	50	20	30
I	50	10	40
J	80	20	....
K	47	10	43
L	33	....	67
M	38	10	52
N	68	....	32
O	55	28	17
P	90	....	10
Q	....	....	....
R	65	8	27
S	....	....	100
T	60	20	20
U	38	....	62

The records of the various hospitals show too frequent removal of ovaries, in part or in whole, for normal or minor distortion (Table XI). We would judge that the majority of these cases represented small portions of ovaries made up of corpora lutea or corpora hemorrhagica which distorted the surface of the ovary. Many of these also represent portions of ovary containing crops of developing follicles. It is true that some of these cases represented corpus luteum hematomata; however, surgical removal with resultant scarring of the ovary is not the treatment of choice in our experience.

The conclusion is reached that additional education is also required to improve the practice of ovarian surgery. One tempering remark must be included: It is very definitely true that some early endometrial implants and some regressing corpora lutea mimic one another very closely. Therefore, the conscientious surgeon should have in his record a certain percentage of normal ovaries representing biopsies of these questionable cases. If the surgeon has not removed any normal ovary, it would indicate that his index of suspicion concerning endometriosis was low and inadequate.

Cystic ovaries need further comment. All too frequently, moderately sized cysts are removed with a portion of surrounding ovary with resultant scarring and further development of cysts, possibly because of hypo-ovarianism, but chiefly due to scarring of the cortex and development of adhesions. Therefore, it seems that the utmost care should be exercised in the removal of true cysts of the ovary in order to keep the amount of scarring and adhesions to a minimum.

DISCUSSION

This survey reveals that there is a great need to evaluate the practice of surgery in many hospitals. This survey covered hospitals used by surgeons late in their professional career, by those in their prime, and by those beginning their practice of surgery. It covers hospitals in various states and in communities of varied races, religious, and economic status. It covers both large and small hospitals. Hospitals under lay and medical administration are also included.

Definite criteria were established for evaluation of appendiceal, gallbladder, uterine, tubal, and ovarian pathology. These criteria were applied rigidly and supplemented with chart evidence whenever possible. Since charts from outside hospitals were not available, the survey figures may do these hospitals a slight injustice because many times the information received with tissues is scanty. However, whenever there was question, the case was eliminated, and we do not believe that any major distortion of the figures occurred.

The survey reveals that all too frequently the viscera removed were found to exhibit only minor pathology or none at all. This frequency was definitely reduced in those hospitals which had had available to them the services of a pathologist over a period of years. This, it is felt, points definitely toward a deficiency in knowledge on the part of many surgeons which needs correction. It may also mean that the surgeon with a tendency toward commercialism does a much better job with someone looking over his shoulder.

The deficiency in knowledge appears to be primarily one in basic science. Knowledge of the normal physiology of the ovary is especially lacking. The role of the appendix as a lymphoid organ is apparently little understood. Gallbladder function in relation to the liver is also poorly recognized. Uterine pathology is only partially known.

Not all of the poor record can be written off as due to lack of knowledge. To do so would be "whistling in the dark." In my opinion, many surgeons, for various reasons, must be relaxing their scruples and forgetting ethics. The number of normal uterine tubes removed in women of child-bearing age cannot be interpreted in any other way. Unnecessary surgery in this instance certainly suggests unnecessary surgery in others. It is true that all physicians make mistakes, but the poor record of the survey cannot be explained away on this basis either. There are too many normal tissues and minor pathologies for all to be mistakes.

CONCLUSIONS

1. This survey shows a record in surgical pathology that is not one to be proud of.

2. There is a real need for every hospital and surgeon to survey surgical pathology.

3. Such surveys serve as potent educational forces for the surgeon, the staff, and the pathologist.

4. Such surveys tend to curb commercialism in surgery.

5. Surgeons need better training in applied basic sciences.

6. Encouragement of more graduates to become pathologists would help solve the problem.

7. Additional means of improving the surgical record must be found.

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Experiences with Cholangiography*

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For more than 10 years, we have had continued interest and experience in radiographic evaluation of the biliary ductal system and anatomically associated structures. It is not the purpose of this report to review the basic work on cholangiography nor to dwell on points of difference between the observations of others and our own; rather this report is intended to provide a correlative appreciation of the intimate relationship that exists involving the gallbladder, biliary ducts, the pancreas and its excretory passages, the duodenum, and the ampulla of Vater with its associated sphincter of Oddi.

BILE DUCT CALCULI

Colcock[1] and others[2] have stressed the frequency with which calculi have been overlooked in the bile ducts in the course of routine cholecystectomy. Reliance on palpation, inspection, and aspiration of the common bile duct to determine the coexistence of stones has been notably inadequate. Undoubtedly the gallbladder is the most common location for calculi, but it should be kept continuously in mind that they may be found in any location along the biliary tract. As the Lahey Clinic has widened its indications for exploration of the common duct, more stones have been found. At the present time they explore the common duct in 45.7 per cent of cases of cholelithiasis and discover stones in 16.8 per cent.[1] In other reports,[2] the incidence of common duct calculi rises to as high as 26 per cent and it may be truly said that the higher the number of ducts explored at cholecystectomy, the greater will be the number found to harbor calculi in the main ductal system.

The usual indications for exploration of the common bile duct may be listed as follows:

1. Dilatation of the common duct
2. Palpable stone or stones in the common bile duct
3. Jaundice—current or antecedent episodes
4. Multiple small calculi in the gallbladder
5. Pancreatitis
6. Recurrent symptoms following operations on the gallbladder
7. Frequent attacks of biliary colic
8. Aspiration of purulent bile from the cystic duct
9. Sediment noted on aspiration of the common bile duct.

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THE POSTCHOLECYSTECTOMY SYNDROME

In giving consideration to the generally recognized indications for ductal exploration, we were aware of a growing incidence of the postcholecystectomy syndrome. As surgery progressed with increasing safety for the patient, the removal of the gallbladder began to be considered more lightly. This surgery became frequent and was regarded by many as no more serious than an interval appendectomy or herniorrhaphy. As more gallbladders were removed, more patients were discovered to have the same symptoms of indigestion, upper right quadrant distress, acholic stools, and episodes of true colic that had existed prior to their surgery. In fact, some large clinics reported many of these cases in the immediate postoperative phase and while the patient was still hospitalized. The postcholecystectomy syndrome is due to:

1. Error in diagnosis
2. Failure to recognize
   a. Pancreatitis
   b. Hepatitis
   c. Gastric, cap, and duodenal ulceration
   d. Diaphragmatic hernia
   e. Duodenal diverticulum
   f. Renal lesions
   g. Spinal nerve lesions
   h. Osteopathic lesions
3. Undetected ductal calculi
4. Undetected ductal strictures
5. Ductal occlusions with thick bile and sludge
6. Long cystic duct stump
7. Neuroma in scar
8. Ductal stenosis and stricture from operative trauma.

CHOLANGIOGRAPHY AT CHOLEDOCHOSTOMY

The combined factors of overlooked ductal calculi and the postcholecystectomy syndrome possibly existing in our patients prompted our initial efforts at evaluation by roentgen investigation at the operating table. Our first procedures were operative cholangiograms, made by the injection of 10 cc. of Skiodan-Acacia solution into the dissected cystic duct after preliminary ligation of this duct at the neck of the gallbladder to prevent reflux into this stricture. The contrast medium was injected slowly but continuously with moderate pressure, during which time four ex-

posures were made. Difficulties of a mechanical nature and inadequacies of equipment that could not be solved to our satisfaction arose in the making of these films; however, our objectives were met. By this direct method we could ascertain which cases required exploration of the common bile duct for the removal of calculi and which might be let alone. With a built-in Bucky diaphragm in an operating table, we feel that this technic is one of value to be used routinely to eliminate the possibility of overlooked stones in the bile ducts or their tributaries. It is not always successful in doing so, though if care and careful study are used, the percentage of error should be minimal.

Because of the mechanical difficulties with which we were faced, we decided to change our approach to the problem by performing routine choledochostomy, exploration of the ducts, T-tube intubation, and immediate T-tube cholangiograms. After thorough evaluation of the open common bile duct, with the passage of Bakes dilators through the ampulla of Vater, the duct was closed with 5-0 atraumatic catgut over the largest T-tube the duct could accommodate comfortably, and the abdomen closed. The patient was then transported to the x-ray department for film study, and the contrast medium slowly instilled through the T-tube under fluoroscopic guidance with spot films made directly from the screen. The sterile operative set-up was maintained in the operating room, and any patient presenting overlooked inclusions in the ducts was returned at once to surgery, redraped, reopened, and the stones extracted, repeating the T-tube intubation during the closure. We felt this added accuracy to management since better films could be produced using standard diagnostic equipment instead of the portable unit. Where reopening was necessary, from the surgeon's standpoint it was not a case of re-entering a field with partially healed tissue, and it saved the patient the expense of another trip to surgery with prolonged hospitalization.

Management of Patient.—

The immediate postoperative management of these intubated patients is not complicated. Early ambulation is instituted on the evening of the day of operation, the T-tube being clamped and disconnected from the tube leading to a drainage bottle while the patient is out of bed.

Beginning on the morning of the fifth postoperative day and twice daily thereafter, a 2-ounce Asepto syringe-full of warm normal saline solution is instilled through the T-tube. Never is the bulb of the syringe used, as increased intraductal pressure is certain to produce severe distress in the right upper quadrant. Mere gravity drainage will suffice and great variance in the rate of flow is normally noted in the same patient. A dram of warm olive oil is floated on the saline, and after it has left the syringe, the T-tube is clamped for ½ to 1 hour. The postoperative dietary regimen returns to a full gallbladder diet within 3 or 4 days of operation. On the tenth postoperative day, if no obvious abnormality has been noted in the course of these irrigations, T-tube cholangiography is again carried out under fluoroscopic guidance.

Precautions.—

Several precautions are to be taken in the performance of these studies. First and before the injection of any contrast medium, the T-tube and duct are gently flushed with about 10 cc. of warm normal saline solution to eliminate the air bubbles that might be present to produce translucencies resembling nonopaque calculi. Immediately a warmed contrast medium such as Medopaque or Skiodan is slowly instilled under screening, using minimal pressure on the plunger of the syringe. Any noticeable filling in a retrograde fashion of the hepatic radicles or pancreatic ducts is an indication of functional or organic contracture at the sphincter of Oddi and calls for cessation of all pressure on the plunger of the syringe. Frequently, the lapse of a little time, without pressure, permits the passage of the opaque medium into the duodenum, and resumed pressure at that time results in no further ductal distention. This diagnostic procedure should be completely painless to the patient, and no distress should be noted.

The appearance of upper abdominal pain is an indication that too much pressure is being utilized, and evaluation of film and screen findings will be in error because of local tissue reactions to this pressure. Experimental measurements of pressures within the common bile duct, utilizing a water manometer connected to the T-tube, show the normal range to be from 0 to 18 cm. of water. Any pressure that exceeds this upper limit of normalcy will result in the rapid appearance of pain which characteristically resembles that of biliary colic. Thus, in the performance of delayed cholangiography in the postoperative patient, caution must be exercised to avoid excess pressure in the course of instillation of the contrast substance. Slow ductal filling, as observed under the fluoroscopic screen, prevents overdistention and excessive reflux into the liver and pancreas and yet will allow opacification of the ductal system that is not artificially dilated to rule out residual calculi and to determine the physiologic activity present.

Bakes dilators are olivary obturators on malleable silver handles, manufactured in sets of nine ranging in diameter from 3 through 11 mm. In using them routinely as exploring implements in the course of choledochostomy, certain precautions must be observed. Although blunt, they can easily be pushed through the wall of the duct to produce a biliary fistula. In each case, exploration should be begun with the smallest size and succeedingly larger dilators used until the operator is fairly certain that he has not overlooked any calculi and that he has gently stretched any organic contracture that might exist in the sphincter of Oddi. Some gauge as to the upper limits of dilatation can be gleaned from ascertaining the luminal diameter of the duct at the incisional level, and never should attempts be made to dilate the ampulla to a size greater than this. Trauma is definitely to be avoided, and excessive dilatation will result in postoperative edema of the sphincter and ampulla for several days with the probability of a terminal increase in fibrous stenosis at this level. For this reason, rarely is a dilator greater in diameter than 6 mm. inserted into the duodenum, and all dilatation is carried out slowly and repeatedly and in a gentle atraumatic fashion. This is an operative technic that should never be hurried. Occasionally there will be a patient in whom the 3-mm. dilator cannot be passed. Often, in such cases, the common duct is dilated to a caliber beyond 6 or 7 mm. In these people, we feel that longitudinal duodenotomy through the anterior wall should be performed at the ampullary level and by direct visualization; the dilator then may be passed through the normal orifice and the sphincter either stretched or cut prior to transverse closure of the duodenum. Bakes dilators have been incorporated in a lithophone devised by Kirby of the Hospital of the

University of Pennsylvania and manufactured by Pilling. Ductal exploration with this device audibly detects foreign bodies and may reduce the number of cases in which stones are accidentally overlooked. We have had no experience with this instrument.

CHOLEDOCHOLITHIASIS WITH PANCREATIC INVOLVEMENT

Anyone with an interest in the biliary ductal system cannot overlook for long an intimately associated organ. The pancreas has a direct relationship to the structures under consideration, both anatomic and physiologic. Most often, the main pancreatic duct of Wirsung joins the common bile duct proximal to the ampulla of Vater, the terminal portions of both ductal systems being a common channel. Deviations from normal can hardly affect one ductal system without some direct effect on its associate. Studies of Comfort and his associates[3] and Doubilet and Mulholland[4] within the last 10 years have emphasized the clinical frequency of inflammatory states affecting the pancreas. It is without doubt a condition of high incidence and of symptomatology that is frequently bizarre. Since both the acute and chronic forms are very common, pancreatitis must be suspected in all patients presenting acute abdominal pain, and its presence will be confirmed more often when serum amylase determinations are performed as frequently as, and in conjunction with, leukocyte counts.

Acute Pancreatitis.—The incidence of acute pancreatitis is said to be greater than perforations of gastric and postpyloric cap ulcer with which it may be confused. All investigators seem agreed that, etiologically, two factors are involved. One is overindulgence in alcohol, and the other is associated or preexisting biliary tract disease. In the former, alcohol stimulates an increase in gastric acidity which increases the appetite. Acid plus hunger produces secretin in the duodenum, and this hormone is a powerful pancreatic stimulator. Ductal obstructions, especially at the ampullary level, are also stimuli to the secretion of pancreatic enzymes, but bile regurgitation into the pancreatic ducts will activate proenzymes, and the tryptic ferments present then permit autodigestion and acute pancreatitis. Calculi do not have to be obstructive in the distal duct to produce this phenomenon, but their presence at any site may result in reflex sphincter spasm and bile regurgitation. Acute pancreatitis is probably present in at least 33 per cent of all patients with choledocholithiasis.

Chronic Relapsing Pancreatitis.—

The literature of the past few years has made us aware of the existence of a specialized type of pancreatic involvement which one of us (P.T.L.) has been suggesting for the past 20 years on the basis of radiographic findings. Chronic relapsing pancreatitis is a disease of recurring exacerbations separated by varying intervals of freedom from symptoms. It is a somewhat complex syndrome with many facets and may be quite difficult to detect. It is a continuing progressive disease that ultimately ends in complete pancreatic fibrosis and diabetes mellitus. Alterations in serum amylase are inevitably found if blood is taken for examination within 2 hours of the onset of an acute flare-up. The rapidity with which this evaluation may return to normal ranges makes early laboratory testing mandatory. For unexplainable reasons, in this type of pancreatitis there is often but little detectable variation in the serum lipase level.

Poppel[5] has written an excellent treatise on the roentgen manifestations of this disease, and his findings are corroborated by our own experiences as well as by Pendergrass.[6] He describes a papillary sign as the earliest indication of acute or subacute exacerbation in which the ampulla becomes enlarged as the result of edema. If severe, it involves the contiguous duodenal mucosa in all directions. With this there is increased duodenal motility, altered peristalsis, and skipped areas of barium. As the pancreatic head becomes larger, there is noted a widening of the duodenal loop with some displacement of the loop to the right and with evidences of pressure on the inner concave border. The pancreatic area is tender on screening. Cholangiography demonstrating reflux into the pancreatic duct should make one anticipate the occurrence of acute pancreatitis in the postoperative period while the pre-existence of relapsing inflammation can be indicated by the exhibition of narrow and wavy undulation as the common duct courses through the head.

As yet no one has described any specific therapy for this condition. It would seem to us that elimination of known etiologic factors should constitute the primary approach to this problem. This implies abstinence from all alcoholic beverages and normalization of the biliary ductal system. For this reason and to insure proper continuing drainage of bile and pancreatic secretions through the ampulla of Vater, it is our premise that whenever relapsing pancreatitis is suspected or confirmed, not only should choledochostomy be performed with T-tube intubation but, in addition, sphincterotomy should be performed after the transductal manner of Doubilet and Mulholland[7] or the Lahey Clinic,[8] the latter procedure requiring duodenotomy and closure. Where this is done, sufficient time must be allowed for anatomic and physiologic normalization before the T-tube is removed. Ductal flushing as described above is carried out and T-tube cholangiography is performed on the tenth postoperative day. In the absence of contraindications, the patient is discharged from the hospital with the T-tube in place, with instructions to instill 2 to 3 ounces of warm saline solution through the tube twice daily, using a small funnel. Except during irrigation, the T-tube is kept clamped at all times, and re-evaluations are made every 8 to 12 weeks by additional cholangiograms until we are satisfied with screen and film appearance of ducts and duodenum. T-tubes can remain in place for as long as 12 to 18 months, if necessary. Fistulous tracts about the tube never epithelize, and, invariably, all drainage ceases in from 4 to 12 hours after removal of the tube.

MANAGEMENT FOLLOWING CHOLECYSTECTOMY AND DUCTAL EXPLORATION

Similar management is utilized in those patients with no clinical or diagnostic evidences of pancreatic involvement. The intubated cholecystectomized patient usually shows ductal and duodenal normalization when subjected to cholangiography on the tenth postoperative day. When this is the case, the T-tube is removed by rapid traction. Biliary drainage has invariably ceased by the next day, and the patient leaves the hospital on the twelfth postoperative day. If any doubt exists in our appraisal of this study, the patient is discharged immediately with instructions to flush the tube twice daily with warm saline and return for restudy as detailed above.

We realize that this procedure probably doubles the duration of hospitalization required for the average

cholecystectomy patient who has had no ductal exploration. Elective simple surgical removal of the gallbladder is hardly more complex today than appendectomy. However, the incidence of surgical damage to the extrahepatic ductal system in the performance of this operation has risen to alarming proportions, and the need for surgical reconstructions of the ducts has increased tremendously. Colcock[1] reports more than 5,000 gallbladder operations at the Lahey Clinic with but one instance of ductal stenosis resulting. With routine choledochostomy and the obvious need for preliminary careful dissection of the ductal system and associated vascular structures, there are bound to be fewer traumatic accidents to the common bile duct, and there will be less frequent occurrence of the long residual cystic duct that can constitute a location for precipitation of bile solids and the later formation of ductal calculi. Stones have been known to occur in the ducts after removal of the gallbladder and ductal exploration.

The etiologic factor for precipitation of cholesterol and bile pigments is not definitely known, but it is our premise that for an undetermined time, probably relatively short, something produced a deviation in the normal physiology of the duodenum and extrahepatic ductal system. We feel that it is mandatory to explore the ducts and intubate all patients in whom indications exist for surgery of the biliary tract, not only better to eliminate the likelihood of overlooked stones but for the purpose of normalization of duodenal and ampullary physiology. This procedure will not increase the mortality or morbidity and should reduce materially the incidence of surgical accidents resulting in biliary stricture or fistula.

CONTRAST MEDIA

Within the past few months, there has become available a new contrast medium. Known as Cholografin, it is a sterile 20 per cent aqueous solution which, when injected intravenously, allows radiographic opacification of the bile ducts in patients with intact but nonfunctioning gallbladders or of the ducts when the gallbladder has been removed. Concentrations of this radiopaque substance are sufficiently high to permit film study of the ducts within 20 to 25 minutes of injection, with maximum concentrations occurring in the gallbladder in from 2 to 2½ hours after injection. Sensitivity to this substance may exist, for which testing should be done. As yet there have been no untoward reactions noted in our experience and relatively little in the literature. Its use is probably contraindicated in the presence of jaundice, whether obstructive, hemolytic, or hepatocellular, and also in all patients with known liver damage. It is a valuable addendum to the medicaments already available, such as Priodax and Telepaque, for cholecystography, and materially enlarges the diagnostic horizons in patients for whom these substances would not suffice. It is much too early to say that this new substance will make the older media obsolete; in fact, there may be cases where greater diagnostic accuracy would result from the combined use of Cholografin and an oral product. For those surgeons who may disagree with our premise that all common bile ducts should be explored and intubated at cholecystectomy, its use will give preoperative indication or suggestion of ductal stones and help lower the incidence of overlooked calculi. However, we feel that the employment of this medium is not a substitute for normalization of the ductal system which requires exploration, intubation, lavage, and, on occasion, sphincterotomy.

CONCLUSION

1. There is a very high incidence of undiscovered calculi in the common and hepatic ducts of patients who have undergone cholecystectomy.

2. The postcholecystectomy syndrome occurs too frequently after surgical removal of the gallbladder.

3. The most practical method of ascertaining the existence of ductal stones is by choledochostomy and careful exploration with Bakes dilators or a lithophone.

4. No specific factor has yet been discovered to account for the formation of biliary calculi.

5. Pancreatitis is a disease of frequent occurrence, the existence of which is confirmed by serum amylase determinations and radiographic diagnostic methods; it is usually associated with abnormalities in the biliary ductal system.

6. The most plausible etiologic factor for inflammatory and calculous disease of the biliary and pancreatic ducts is derangement of physiology at the ampullary level in the duodenum and at the sphincter of Oddi.

7. Choledochostomy and T-tube intubation should be performed in all cases requiring cholecystectomy and in those patients exhibiting relapsing pancreatitis; sphincterotomy should be performed in the latter.

8. Careful cholangiography using a T-tube is the gauge of normal physiology in the ducts, the head of the pancreas, and the duodenum. Normalization by diet, gentle flushing, vasodilators, and osteopathic manipulative treatment is to be achieved before removal of the T-tube.

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Cardiac Surgery

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The newest of all surgical specialties is that of the heart. In 1896 Stephen Paget[1] wrote, "Surgery of the heart has probably reached the limits set by Nature to all surgery; no new method, and no new discovery, can overcome the natural difficulties that attend a wound of the heart." Imagine his surprise when a few months later Rehn[2] successfully sutured a human heart. From that day intrepid surgeons have succeeded in performing one miracle after another in cardiac surgery, until today almost every medical periodical carries articles on the subject.

Harry Sherman[3] wrote: "The road to the heart is only two or three centimetres in a direct line, but it has taken surgery nearly 2400 years to travel it." Surgery is now making up for the delay; the road is being traversed with increasing regularity by more and yet more surgeons. Cardiac clinics have sprung up all over the world, and almost daily new achievements are reported. New technics, new instruments, new antibiotics, and new anesthetic agents are being added to the growing stockpile to be used in the battle against congenital and acquired cardiac diseases.

Obviously, without the antibiotics, none of these miracles would have been possible. To Sir Alexander Fleming goes the credit, for his discovery of penicillin provided the impetus which has resulted in the discovery of streptomycin, aureomycin, Chloromycetin, neomycin, Terramycin, and the still newer antibiotics.

Anesthesiology, too, must be recognized for the great part it has played in the realization of Sir Lauder Brunton's[4] dream of 1902 when he said that "the good results that have been obtained by surgical treatment of wounds in the heart emboldens one to hope that before very long similar good results may be obtained in cases of mitral stenosis." Gone are the days when the referring doctor said to the surgeon, "You do the work, and I will come in and pour the ether." Anesthesiology is a full partner in the accomplishment of a surgical operation today. The anesthesiologist is a highly trained specialist and is essential to success in this new field of surgical endeavor.

For many cardiac cases, I like intravenous Pentothal sodium and procaine, plus intratracheally administered oxygen. This decreases the possibility of acute pulmonary edema and allows coagulation by electric current without danger of explosion, thus shortening operative time. The procaine is given preferably by continuous drip through a polyethylene cannula in the vein in the right forearm. Should large quantities of blood replacement be needed, this is a splendid site where it may be given, under pressure if necessary. Intra-arterial transfusions are not often needed.

A few years ago a man advertised that he would refrigerate a subject in the show window of a Hollywood shop on succeeding days. He promised he would bring him back to life after varying lengths of time under refrigeration. He did this new and daring stunt for several days until an outraged populace caused his arrest and incarceration in the Hollywood jail. Now refrigeration is an approved method of anesthesia for certain operations, notably the repair of intracardiac septal defects under direct vision. The bloodstream is so slowed down that the heart can be opened, operated on, and closed with a minimal blood loss and shock to the patient.

I have seen in operation the amazing instruments of Dodrill and Gibbon, by which the heart and/or lungs can be by-passed while intricate operations are done on the heart; the work of these organs is done by pumps and oxygenators outside the body. I believe that as time goes on the price will come down so that some day one of our research departments may have one of these valuable pieces of equipment. The anesthetic agent used in these operations is intravenous Pentothal sodium with intratracheal air.

COARCTATION OF THE AORTA

Coarctation of the aorta is a congenital abnormality. In the adult type there is a narrowing or complete obstruction of the aorta near the ductus arteriosus or its remnant. Patients who have this unfortunate abnormality have a variable prognosis. Some survive for a considerable time, while the others, a majority, have a very short span of life. The symptoms may come directly from the arterial obstruction or from one of the complications. These include (1) aneurysmal dilatation of the aorta above the constriction, (2) rupture of the aorta, (3) formation of a dissecting aneurysm, (4) superimposed Streptococcus viridans infection, (5) high blood pressure in the upper part of the body, with much lower blood pressure in the lower limbs. Thus the necessity for relief of the condition is apparent.

Anesthesia.—For anesthesia I have used intratracheal cyclopropane and oxygen. Paine and Varco[5] believe that intravenous Pentothal sodium, using 25 mg. of Pentothal to 5 units of tubocurarine per cubic centimeter, known as Baird's solution, with oxygen by the intratracheal inhalation method, is superior to any type of anesthesia previously known. Baird[6] was the first to use curare and Pentothal sodium in the same solution. I now use the modification of Keown, Grove, and Ruth.[7]

Fluids by Vein.—During operation intravenous fluids are essential. In children a cannula should be inserted in the foot before the operation is begun so that should blood be needed immediately, it can be started at once. The cannula can be kept open for 3 days and is a very satisfactory transit for postoperative fluid treatment. The cannula is preferable to a sharp needle because it will not be pulled out of the vein at the crucial moment, nor will it plunge through the back wall of the vein. A three-way cock is a good addition to the instrument. Recently it has been advocated by some that transfusions be given into the femoral artery.[8]

Operative Approach.—The anterior and lateral approaches of the past have been discarded in favor of the posterior one. Notwithstanding the fact that the aorta can be seen readily through the anterior chest wound, the freeing of it with safety, the mobilizing of it, the handling of it, the removal of the segment, and the suturing of the cut ends can be done so much better from the back-wall approach.

Opening the Chest.—The incision should be generous. It runs along the medial and lower borders of the left scapula in a downward and outward direction from the level of the second dorsal vertebra superiorly to the midaxillary point to the tubercle. From the third, fifth, and sixth ribs pieces three-quarters of a centimeter long are removed near the tubercle. The pleura is opened through the bed of the fourth rib. A Finochietto self-retaining retractor keeps the chest wall opened and affords a good operative field. The opening of the chest is a very bloody affair in this condition because of the increased circulation and blood pressure of the upper part of the body. Much blood loss must be compensated by immediate transfusion, so it is necessary to have plenty of blood in the operating room.

Freeing the Aorta.—The aorta is freed by cutting the parietal pleura from the midthoracic area well up over the aortic arch and over the left subclavian artery. This tissue peels fairly easily. If the vessel is kept free of pleura and fatty tissue, the narrowed portion will be seen quite readily. The external view does not show the narrowing of the lumen, but by feeling the vessel between the thumb and forefinger, some idea of the size can be determined. Sometimes the vessel is deeply notched and the obstruction easily seen. The narrowing of the lumen may be high, medium, or low; therefore, careful examination of the position and complete freeing for a considerable portion of the vessel are necessary. The intercostal vessels which come off the aorta below the narrowing must be clamped, cut, and ligated; and they must be handled with great care because they are very fragile and may be sheared off the aorta if handled too roughly. If there are any above the narrow point, they should be taken care of in the same way. This allows considerable freedom of movement of the aorta, especially if the ductus arteriosus is also carefully ligated and separated from the aorta. If the ductus is patent, it should be ligated with umbilical tape, because of the possibility of tearing through of the fine sutures. The aorta is then drawn up by passing a piece of tape around it and drawing it toward one.

Care must be taken to avoid the recurrent laryngeal nerve and the left vagus from which it comes. They are easily seen if looked for near the ductus arteriosus. They will peel off the vessels if carefully handled. It is also necessary to avoid the thoracic duct which lies against the vertebral column between the right and left intercostal arteries just after they leave the aorta. The duct can be seen if a dye is injected into the lower part of the body or is fed by mouth before the operation. However, keeping all instruments close to the aorta will prevent injury to the duct.

Clamps.—Kelly and Kocher clamps keep the vessel tightly closed while operating, but their rigidity tends to bruise the vessels. Moynihan intestinal clamps without rubbers are very good, but the jaws must be shortened to 5.5 cm. and a peg and set-in fitted to the tips to keep them from moving sidewise during the operation. These will hold any size of vessel seen in this operation without danger of tearing or crushing and have strength enough to prevent any leaking of blood. The Bradshaw clamp which is made just for this operation not only holds both ends but can bring them closer together. The newest clamp is that of Jamison.

Sutures.—Fine silk or cotton, interwoven rather than twisted, on a 15-mm. straight or curved atraumatic needle is used.

Excision of Segment.—Clamps are placed so that 1½ to 2 cm. of aorta may be removed, and 1 cm. is left on either side of cut ends for anastomosis. When placing the clamps allowance must be made for the shrinkage which occurs in the ends of the aorta after they have been cut. If one of the ends is larger than the other, absolute coapation cannot be accomplished, so the smaller one is cut on a slant to even up the sizes.

Anastomosis.—The three usual stay sutures (Carrel method) at equal distances are placed in the cut ends and, while holding two of these guys, a running stitch is placed from one guy stitch to the next. The assistant must keep tension off the suture line by pressing the clamps more closely together while suturing is going on, unless this is being done by a Bradshaw clamp. The intima is brought together and no adventitia ever touches the inside of the repaired vessel. Blalock[9] says he closes the vessel as quickly as possible and does not fear the thrombosis that other surgeons seem to fear. The suturing of blood vessels on the whole is entirely different from the intestinal anastomosis type of repair where it is so important to fasten the peritoneum to the peritoneum with all the stitches. Because the posterior aspect is the most difficult to sew, it is done first and the anterior aspect is done last. When the sewing is completed, the lower clamp is temporarily released to see if there is any leak present. If there are any pinholes, they are repaired with a few interrupted sutures and both clamps are removed. The upper clamp is removed very, very slowly to prevent shock from sending a large amount of new blood into the lower part of the body. The following precautions will probably save the patient's life. (1) Take 5 to 6 minutes to release the clamp fully. (2) Place the patient in the Trendelenburg position. (3) Give 150 to 250 cc. of blood quickly and under pressure into the cannula in the foot.

Closure.—In closing the chest wall, care must be taken to avoid the large vessels all over the wound and to watch for any seeping of blood into the cavity. A large catheter left in the cavity will serve to re-expand the lung if suction is put on it when the chest is almost closed. It can be removed when the last stitch is placed or left for 4 days with negative pressure suction present.

Postoperative Care.—If the lung has been re-expanded, use of an oxygen tent is not necessary. Penicillin and sulfadiazine are given for 5 or 6 days postoperatively. If sufficient pieces of the ribs are removed the ends will not rub, and there will be no postoperative pain. The ribs will heal from the periosteum which is left. Dicumarol or heparin is not necessary if the arterial ends have been well anastomosed. It may be necessary to aspirate fluid from the operated side. The bleeding is probably from the chest wall and not from the anastomosis if this was skillfully and carefully done.

This operation should be done on dogs a number of times before one is brash enough to attempt it on a human being.

PATENT DUCTUS ARTERIOSUS

The ductus arteriosus is a necessary part of fetal circulation. At birth its usefulness ends, and it should become obliterated. At 12 weeks 95 per cent are closed, and 99 per cent are closed at the end of the first year. As long as the ductus remains open, blood pours through it because there is a differential pressure between the aorta and the pulmonary artery. As long as the aortic pressure is greater than that of the pulmonary artery, the flow is from the aorta to the pulmonary artery, and cyanosis does not occur. If the

reverse is true and blood passes from the pulmonary artery into the aorta, cyanosis is present. The propulsion of blood from the aorta into the pulmonary artery is forceful and produces a vibration similar to that of an arteriovenous fistula. This leak produces dilatation and hypertrophy of the heart, which in most cases lead to bacterial endocarditis, endarteritis, heart failure, and pulmonary infections. Death comes as a result of one or more of these complications in 80 per cent of cases.

Diagnosis.—Cardinal symptoms are weakness, shortness of breath, and fatigue on exertion. Patients are undernourished, underdeveloped, and cyanotic unless compensation is established. Thrill and murmur are the most important diagnostic aids. The thrill is felt in the second or third intercostal interspace. The murmur is loud and machinelike, is systolic and diastolic, and is heard at the same place as the thrill, but can be heard more faintly near the apex. The systolic arterial pressure is normal. The diastolic arterial pressure is less than normal. The pulse pressure is increased. The heart may be normal in size. The murmur may be heard in the region of the neck and between the scapulae as well as the places previously mentioned.

Surgical Therapy.—

J. C. Munro[10] attempted to close a patent ductus arteriosus in 1907 and Strieder in 1937,[11] but both attempts were unsuccessful. Gross and Hubbard[12] performed the feat successfully in 1938. In 1944, Gross wrote that he had changed his technic from a simple ligation because after he had performed the operation on 14 patients he found that the condition had recurred in several of them.[13] His second type of closure, consisting of ligating the ductus and surrounding the ligation with cellophane, was tried on 28 patients, some of whom suffered recurrences. He then performed the operation by ligating doubly and cutting between the ligated parts to separate the aorta from the pulmonary artery permanently. He tried this on 14 patients, and all results were satisfactory when reported.

Blalock[14] does not think it is necessary to separate the ductus by cutting it, since he believes there is too much danger from secondary hemorrhage in the hands of the average chest surgeon. He performed 19 operations with no accidents and no hospital deaths. However, 6 of the patients had Streptococcus viridans infection at the time of surgery, and 2 of them died some time after they went home. One, in which two braided silk ligatures were used, developed recurrence. She was brought in for a second operation notwithstanding the fact that she had a Streptococcuc viridans infection. Although she had a successful operation this time, she died 3½ months later at her home.

All of this led Blalock to change his technic. He used two pursestring sutures, not too tightly tied, at each end of the ductus as close to the large vessels as possible and two straight clamps placed side by side between the pursestring sutures. The ductus was then sectioned between the clamps, and the ends sutured. Although he encountered no difficulty in two operations, he thought sectioning the fragile ductus was too dangerous and quite unnecessary, so he developed his present technic. First the full length of the ductus is freed from any adjacent structures, and pursestring sutures of fine silk are placed at the extreme ends of the ductus so that they catch only the adventitia of each end. Each suture is tied just tightly enough to prevent flow of blood, but not tightly enough to cut through the fragile vessel. Two through-and-through mattress sutures of silk are now passed in the ductus between the two pursestring sutures. Next a ligature of umbilical tape is tied over the mattress sutures. There have not been any cases of re-establishment of the patency in these cases. Blalock feels that this technic is much to be preferred to sectioning with its danger of fatal hemorrhage. In commenting on division and closure, Blalock said that surely the use of pulmonary pursestring sutures would help to make the cutting operation more safe.

Potts clamps are among the latest instruments developed for use in operative closure of the patent ductus. They do not slip, and they do not cut through the fragile vessel. Potts[15] got the idea from the Indian fakirs who lie on spikes.

Care must be exercised in this operation to keep from injuring the vagus nerve and its branch, the recurrent laryngeal nerve, which are close to the ductus.

In the past few months grafts of artery or vein have been used, and in some hospitals vein and artery banks have been added to the blood, bone, and eye banks.

MITRAL STENOSIS

Mitral stenosis is the commonest of the acquired valvular conditions. The mitral valve normally looks very much like the mouth. When the mouth has been burned badly, the result is a slit, narrow and rigid. Following rheumatic fever the mitral valve presents the same general appearance. Commissurotomy, for the purpose of repair, is done either by digital or instrumental separation of the adherent valve leaflets. The index finger is introduced through the left atrium and by deft, carefully guarded manipulations both of the valve commissures are enlarged. Thus the proper amount of blood is permitted to course through the ventricle, but it is not opened enough to allow a condition of regurgitation, which would be worse than the stenosis. When the finger technic is not successful, a Bailey commissurotomy knife is used to cut first one and then the other leaflet, or only one for fear of regurgitation or, worse still, an uncontrollable hemorrhage. The first successful commissurotomy was done by Souttar in 1925.[16]

Commissurorrhaphy.—Bailey[17] places a sling of pericardium across the mitral leaflets by ingenious needlework and supports the strut against the ventricle when too large an opening has been made in the valve and regurgitation has replaced stenosis. The open valve is not brought in close contact or a stenosis would be brought about again, but just provided with a halter to prevent flailing of the valve.

Cerebral Embolism.—For the prevention of cerebral embolism during surgery to the mitral valve, Bailey and his associates[18] worked out a technic which is, to a large measure, effective. The left common carotid artery is located, mobilized, and an umbilical tape placed around it; traction is made to kink it. A silk suture is next placed around the innominate artery by use of a ligature carrier, but it is not tied. It is moved about so as to allow a noncrushing clamp, such as a Potts, a Beck, or a Rumel, on the vessel. The right radial pulse stops when this has been done. This clamp is kept on for the entire time the intracardiac work is being done. The left common carotid artery is kinked for periods up to 30 to 60 seconds when debris or clot might be released into the bloodstream. This prevents embolization to the brain. All clots are removed from

the atrium and when clear, the finger is inserted as previously stated.

Bolton and his associates[19] state that aortic, tricuspid, or pulmonary disease may be found during a mitral valve operation, and that therefore one should be prepared to take care of two valves. The decision as to which valve should be worked on first depends on the experience of the operator and the speed with which he can carry out the second procedure. However, the statement is made that, in their opinion, ". . . the mitral valve should be attacked first if there is any reasonable possibility of being able to treat the aortic valve afterward . . ." and further that ". . . aortic commissurotomy may be performed so much more rapidly than mitral commissurotomy. This is important if quick termination of the operative procedure is necessary.

AORTIC STENOSIS

Aortic commissurotomy is done through a stab wound in the ventricle around which a pursestring is sewn. Then Bailey's aortic dilator, with its filigree valve finder ahead of it, is inserted into the ventricle and up into the aortic valve. The handle is then pressed; the three expanding bars fit into the three commissures and enlarge the stenotic aperture without injury to the valve cusps. The instrument is so constructed that the bars are on a swivel and find the commissures automatically. The pursestring is kept tight around the instrument by the use of the Rumel tourniquet to prevent untoward loss of blood. The chest is closed in the usual way.[20]

CORONARY OCCLUSION

Myocardial infarction, angina pectoris, and acute coronary insufficiency all stem from atherosclerosis of the coronary arterial system.

Many surgical operations have been devised to increase a blood supply to the heart. Among them was Beck's suturing of adjacent vascular tissues, such as the pectoral muscles, to the surface of the heart muscle; the epicardium was removed with a burr to raise the chances of success of a communication between the two muscle bodies.[21] Later lung and even omentum were used for the same purpose.[22] Thompson[23] used talcum between the pericardium and the epicardium to set up an inflammatory process resulting in increased vascularization of the heart muscle. Beck[24] used powdered asbestos with better results.

Still another concept was that of doing a total thyroidectomy, thereby slowing up bodily activities and lessening the number of anginal attacks markedly. A controllable disease, hypothyroidism, was produced to prevent an uncontrollable one. The basal metabolism rate kept from minus twenty to minus thirty compels watchful care.[25]

Roberts and his associates[26] suggested that if an ischemic myocardium were revascularized by the anastomosis of a large artery with the coronary sinus and coronary vein, angina might be eliminated. Beck and his co-workers[27] performed this feat in the laboratory and proved its worth, before applying it in human beings; Bailey and his coworkers have performed a number of such operations with startling results.[28]

The operation consists of two stages: The first, a segment of a large superficial vein such as external jugular or median basilic of the arm is chosen, without valve, if possible, and stripped of all excess adventitia and perivascular tissue. It is placed in heparin solution for a while and then kept between layers of moist gauze until needed. Under Pentothal sodium anesthesia by Keown's method (endotracheal) a posterolateral incision is made over the seventh rib which is usually removed. The lung is kept up out of the way, and the diaphragm is kept down with hot packs and hand-held retractors. The pericardium is opened widely and kept open by use of traction sutures placed at 2-cm. intervals.

The coronary sinus is located and traced to its entrance into the right atrium. A heavy orlon suture is placed around the vessel 1 cm. from the atrium. This is left *untied at this stage* and rolled up in a coil by using 00000 silk suture to anchor it in place. A place in the sinus away from the orlon suture and near the aorta is chosen for the anastomosis. It is cleared of fat and a puncture of 6 to 8 mm. is made in the sinus after a clamp has been placed on it. Stay sutures will help to open edges and allow heparin to be irrigated into the sinus. The graft is attached to the opening, intima to intima, with 00000 arterial silk on an atraumatic needle; sutures are placed 1½ mm. apart using a running technic. When the Satinski type clamp is removed, venous blood comes up into the graft and out the other end. A slit is made in the thoracic aorta, and the graft is sewed into it, with the technic used on the other end. Care is exercised to prevent leaking. Bailey has changed the technic in that he cuts a circular hole in the aorta to be sure of its remaining patent.

The second stage is performed 3 weeks after the first. The incision is reopened and the operative site examined. The orlon suture is located and tightly tied over a 3 mm. probe. After tying what has been a double suture as two separate sutures the probe is removed; thus a safety valve of 3 mm. is left for a little sinus blood to escape into the right atrium. The chest is then closed in the usual way with water seal drainage.

Another modification of Bailey's is that he uses the splenic artery in some cases instead of the thoracic aorta. A third modification is use of an everting mattress suture for the anastomosis between the aorta and the graft instead of the running one, because the artery tends to pull the intima in and away from the other walls of the vessel.[28] The results I have seen of these operations have been phenomenal.

THE HUFNAGEL PLASTIC VALVE

A plastic tube containing a nylon ball is placed within the sectioned thoracic aorta and tied into place to overcome the results of valvular insufficiency.[29] When a patient who has had one of these instruments inserted opens his mouth, a "click, click, click, click" is plainly heard, proving that the valve does work.

CONCLUSION

Heart and great vessel surgery are in their infancy, and changes are taking place from day to day. Up to now there is little standardization of technic, but many miraculous operations are being performed in the Hahnemann Hospital in Philadelphia and in many other cardiac centers throughout the land. Out of them will come more and more technics of greater and greater worth and, mayhap, simplicity. Who knows where it will end? Our hats are off to the discoverers, and our coats are off to help carry on the work. May I modify what someone said of Cajal to apply to the men who are leaders in cardiac surgery —They are many-sided geniuses impelled by the mys-

terious "whisper" which comes to God's chosen few and which draws them ever onward to explore beyond the horizons of existing knowledge, without rest and with no need for recompense other than to know that they have entered the promised land of discovery.

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Facts and Fancies of Cancer Therapy

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Cancer is man's most relentless enemy, the greatest single cause of death, and a direct challenge to every physician. The fate of the majority of cancer victims is decided by the action of the doctor he sees first. The awesome responsibility of determining life or death belongs to that physician.

It is patently impossible to explore all of the many ramifications of neoplastic disease treatment in this paper; only certain pertinent facts and fancies of cancer therapy can be discussed. At the risk of seeming redundancy, a brief review of the legal aspects of practice will be made.

The attending physician must act at all times in a manner consistent with the standard of practice in his community. The standard of practice is established by what the ordinary, reputable physician would do and what he would refrain from doing in the care of a similar case. This legal principle applies to a patient with neoplastic disease as in any other case.

The standard of practice applies to diagnosis as well as treatment. Thus, if the ordinary practitioner would, in view of a particular case, utilize certain diagnostic procedures as x-ray, biopsy, et cetera, the standard is thus established in that type of case. Also, standard procedures must be followed if the doctor is to avoid a legitimate charge of malpractice in the care he renders to a case of that particular kind. We are all aware of the increasing number of malpractice cases; no intelligent physician will intentionally fail to take precautions to keep himself out of court.[1] This fact provides one of the chief aims of this presentation, to warn physicians of certain pitfalls and to point out a safer road to more effective therapy of cancer cases.

It has already been stated, but bears repeating, that the great majority of patients with cancer or danger signals of cancer first consult their own physicians and are guided chiefly by the advice given by those physicians. Yet, repeated surveys have been alarmingly consistent in showing that education of doctors in the complex ramifications of malignant disease has fallen somewhat behind the corresponding increase in cancer education acquired by the average intelligent layman. The protean nature of cancerous disease, the lack of acute manifestations, and the paucity of day-by-day occurrence of adequate numbers of similar cases, all combine to make a difficult problem for the physician. Previous and current developments in the cancer field have taken place so rapidly that the general practitioner is often unaware of the changing outlook that these developments demand.[2]

One of the weakest points in the cancer attack is the fatal time lag from suspicion to recognition and from diagnosis to treatment. Cancer is simultaneously one of the most curable of all diseases and the most incurable of all diseases. This seeming paradox is explainable on the basis that most early cancers are curable, but after the disease has advanced sufficiently it is incurable and leads to certain death. A glance at the records will show that today 25 per cent of cancer cases are saved by treatment in the form of surgery,

x-ray, or radium. An additional 25 per cent, twice the present rate, could be saved without a single new test or treatment, just by utilizing present knowledge. The remaining 50 per cent, unfortunately, can be salvaged only through new discoveries coming from research.

It is small wonder, then, that this rather dismal picture of neoplastic disease has given rise to a considerable number of fads and fancies in the realm of therapy for cancer and allied diseases. Some of the modalities devised have stemmed from originally honest convictions of their efficacy and some from a limited background of experimental research, but all too many are blatant quackery based on conscienceless acquisition of wealth by deliberate fraud. A small percentage seemingly are based on ignorance without fraudulent intent, but their effects are no less devastating to the desperate victim of cancer. Many such "treatments" owe their continued existence purely to the fact that the victims actually did not have cancer, but were only told they did.

Even in the limited sphere of this writer a month rarely passes without there coming to his attention a "new" or "secret" treatment or "cure" for cancer. Some of these panaceas have been conceived in the fertile minds of laymen; others have had their origin in the presumably more fecund minds of practicing physicians. One should not, of course, ignore the possibility that some sound idea might thus arise, but so far these therapies have largely been "secret," to be divulged only after the receipt of money. While no man should represent himself as a true prophet of the future, my opinion is that the key or keys to the many-locked secrets of cancer will not be delivered through such a medium, but only from scientific research.

In order to evaluate more properly and scientifically new and disputed methods of treating cancer, there has been established a committee of the National Research Council known as the "Committee on Cancer Diagnosis and Therapy." It is endorsed or supported by the Pure Food and Drug Administration, the American Cancer Society, the National Cancer Institute, the Damon Runyon Fund and other interested agencies. The Committee provides an impartial evaluation procedure to determine the value of disputed treatment methods. Those persons claiming to have a "sure cure" may thus have a scientific evaluation of their claims. Needless to say, few are willing to have such a searching analysis made for obvious reasons.

Pulp magazines and those with sensational formats frequently pose as defenders of supposed victims of a therapeutic hierarchy which refuses to permit advances in cancer therapy. While some are well intentioned, though ignorant of the true facts, others deliberately use the topics for sales promotion to gullible readers.

In order to evaluate the material which comes to our attention, we should all become familiar with the remarkable advances of an accepted nature evolved for cancer therapy during the past 10 years. While space does not permit their detailed discussion, they include radical surgical procedures, improved radiation technics, radioactive isotopes, and several chemotherapeutic agents. Although only surgical and radiation approaches can be said to be curative, the chemical substances have been invaluable in palliation and increasing the comfort of the life remaining to the cancer victim.

Since control of infection and better understanding of the disturbed physiology resulting from surgery have made surgery safer for the patient and the patient safer for surgery, more and more extensive mutilative attacks are being made to remove not only the site of the tumor growth but also its regional metastatic routes. There is an increasing trend toward "second look" operations to evaluate the benefits of or need for extirpative surgery in abdominal cancer. Wangensteen and his associates[3] have been the champions of this mode.

Irradiation, as supplied by x-ray, radium, and a number of radioactive isotopes may supplement or substitute for surgery. However, the great hope remains that some chemical substance or group of substances may yet be evolved which will selectively destroy cancer cells without producing irreparable damage to normal body cells. When one considers the many varieties of cancer cell structures, the likelihood of development of a single agent as a panacea seems remote.

In the last decade several chemotherapeutic agents have been developed. They include nitrogen mustard for the malignant lymphomas; aminopterin, amethopterin, 6-mercaptopurine (6-MP), and ACTH and cortisone for the acute leukemias; urethane in chronic myelocytic leukemia; estrogenic hormones in the management of prostatic cancer and certain breast cancers; and the androgenic hormones in the metastases of breast cancer. None can be considered curative but they are extremely useful in palliation. Table I gives a summary of their uses.

The remainder of this paper will be devoted to other fads and fancies pertaining to cancer. One of the most widespread misconceptions is that cancer causes pain and that if there is no pain associated with a lump, it cannot be cancer. Thousands of patients have lost their lives while they and/or their physicians waited for pain to appear in association with some known abnormality. Early cancer does not cause pain for, with the exception of certain tumors of the nervous system, tumors and cancers do not contain nerves. Pain occurs only when a sensory nerve is invaded or exposed, when the neoplasm becomes large enough to cause pressure on the nerve, or as a result of infection.

Another fallacy is that all cachectic individuals are cancer victims, and that a person cannot have cancer unless he is cachectic and has that "cancer look." Cachexia is a late symptom and when it occurs the cancerous condition may be so obvious that even the patient or his family is aware of its nature. It is a well-known but often overlooked fact that many cancer patients do not show cachexia or loss of weight even in advanced stages of disease.[4]

We all know, but often forget, that cancer must be detected in its early stages if it is to be cured. That a careful case history and a thorough physical examination must be made to detect such a silent, deceptive disease in its early development is axiomatic. This brings up another fallacy, that of a cancer blood test. There is not, to date, any reliable test that can be made on blood or urine that will make a positive diagnosis on all types or all cases of cancer. One might even question the value of such a test if it were found and proved, because the burden of finding where the disease was making its inroads, often an extremely difficult problem, would still fall upon the doctor. But to repeat, for emphasis, there is still no reliable test available.

TABLE I—TABLE OF CHEMOTHERAPEUTIC AGENTS USED IN THE TREATMENT OF CANCER

Name of Drug	Method of Administration	Therapeutic Dose	Toxic Effects	Mechanism of Action	Indications for Use
ACTH	Intramuscular (Solution or gel)	15-40 mg. per day	Salt retention and edema	Unknown	Acute leukemia
Cortisone	Orally	100-300 mg. per day in divided doses	Salt retention and edema, Cushing syndrome	Unknown	Acute leukemia
Aminopterin	Intramuscular or oral	0.5-2.0 mg. per day in tablets	Leukopenia, bloody diarrhea, stomatitis	Inhibits nucleic acid synthesis	Acute leukemia
Amethopterin	Orally	2.5-5.0 mg. per day in tablets	Hematopoietic depression, bloody diarrhea, stomatitis	Inhibits nucleic acid synthesis	Acute leukemia
Nitrogen mustard (Mustargen)	Intravenous via saline infusion	Total dose of 4 mg. per kg. of body weight in divided doses	Hematopoietic depression, nausea, vomiting	Probable alterations in metabolism of nucleoprotein	Hodgkin's disease, lymphosarcoma, giant follicular lymphosarcoma, bronchogenic carcinoma
TEM (Triethylenemelamine)	Orally	5-10 mg. in tablets	Hematopoietic depression	Probably similar to that of nitrogen mustard	Hodgkin's disease, lymphosarcoma, giant follicular lymphosarcoma, bronchogenic carcinoma
Urethane	Orally	1-5 grams daily in tablets	Hematopoietic depression (bone-marrow depression)	Unknown	Chronic leukemia (*especially* myelocytic), multiple myeloma
6-MP (6-mercaptopurine) (Purinethol)	Orally	2.5 mg. per kg. of body weight daily. May be increased later.	Hematopoietic depression, diarrhea, weight loss	Interference with nucleic acid biosynthesis	Acute leukemia, chronic myelogenous leukemia
Estrogens (Stilbestrol)	Orally	15 mg. per day in divided doses	Hypercalcemia, uterine bleeding, edema, gastrointestinal dysfunction	Not precisely known	Breast cancer 10 years or more postmenopausally, breast cancer in male, carcinoma of prostate (with castration)
Androgens			Virilism, acne, increased libido hirsutism, hypercalcemia, edema	Not precisely known	Breast cancer in females with recurrence, especially osseous metastases
1. Testosterone propionate	Intramuscular	50-100 mg. 3 times weekly			
2. Methyl testosterone	Orally	50-200 mg. per day			
3. Androstanolone	Intramuscular	50 mg. 2-3 times weekly			

Whenever the diagnosis of cancer is easy, that is late cancer.

While x-ray studies and certain laboratory adjuncts are of great help, the most reliable of all testing procedures is the biopsy. In many cases the use of biopsy would enable the physician, not time, to make the proper diagnosis. A general rule-of-thumb is to consider all growths as malignant until proven benign; immediate biopsy differentiation should supersede clinical differential diagnosis. To suspect cancer and be wrong is pardonable—not to suspect cancer and be wrong may be fatal.[5]

Actually, almost 85 per cent of all cancers are situated where they may be readily diagnosed. Over 20 per cent are visible, 30 per cent are palpable, and over 30 per cent may be visualized instrumentally. The remaining 15 per cent are by no means clinically silent. They are, however, situated in the internal organs such as the liver, gastrointestinal tract, pancreas, kidney, and brain.[5] Half of all cancers are in sites directly accessible for examination. It can be readily appreciated, then, that the great majority of cancers could be diagnosed.

Another fancy which should be dispelled is that cutting into a tumor for biopsy causes the tumor to grow faster or to spread more rapidly. It is the consensus of the world's leading authorities that this is rarely, if ever, true. But it should be emphasized that rough handling of the growth is dangerous and may squeeze out cells which will metastasize. In any event, the tremendous benefit of accurate biopsy diagnosis certainly outweighs the remote chance of harm by spreading the neoplasm.

Any visible tumor may be infiltrated with procaine and a small biopsy specimen removed. If the material has been taken from the proper site and there is mutual agreement between pathologist and clinician about terminology, the biopsy is the single most decisive diagnostic factor in prognosis and treatment. A negative report on biopsy material should not be regarded as

ruling out the existence of malignancy. It means only that there is no malignancy in the tissue submitted. If malignancy is present the clinician has either failed to select the proper site or has missed the malignant tissue in his biopsy. It should be obvious to all that a good physical examination directs the examiner to the precise area for biopsy.[6]

To return to the realm of cancer nostrums, it must be realized that a critical evaluation of cancer chemotherapy in man is extraordinarily difficult. Cancer is noted for its spontaneous remissions and exacerbations. A remission coincident with institution of some type of therapy may lead the unwary to entirely erroneous and unwarranted conclusions concerning the efficacy of the treatment being given. Since cancer is essentially a chronic disease, survival for many months after onset of symptoms is the rule rather than the exception. Thus, the mere persistence of life in the face of a hopelessly advanced malignancy cannot be accepted as positive evidence that the therapy being given is effective.

Since most cancer patients eventually realize the diagnosis, it is small wonder that they often become depressed and emotionally unstable and develop psychosomatic disturbances. Under such circumstances, psychotherapy finds receptive and responsive material. It can be confidently anticipated that subjective improvement will follow on the institution of any new form of treatment in cancer patients, particularly if enthusiasm and optimism are part of the regimen. Therefore, alleviation of pain, for example, is a singularly poor criterion on which to base a claim for effectiveness for a chemotherapeutic agent.[7] The enthusiastic heralding of dramatic responses in preliminary reports of a new treatment followed by silence would appear to be an indication of the variability in the natural course of malignant diseases under effective therapy.

A favorite trick of the cancer charlatan is to diagnose as malignant a lesion which is inflammatory or otherwise self-limited. Under these circumstances, his remedy often cures "cancer" with dramatic success. It must again be emphasized that only by biopsy and microscopic study can tissues be diagnosed as cancerous.[7]

Testimonials from patients whom he has treated constitute an important part of the armamentarium of the quack. It should be stressed at this point that the high courts of law have consistently held that the opinion of a layman as to whether he has or has had cancer is worthless in evaluating the effects of a cancer remedy.

Space does not permit discussion of the numerous ineffective and/or fraudulent "cancer treatments" which continue to thrive upon the gullibility and despair of many suffering patients and all too many uninformed physicians. Of interest, however, is a listing which appears in the book, "The Physiopathology of Cancer."[7]

The advertising and sales promotions activities for ineffective cancer remedies are constantly increasing. All too often even well-educated physicians and laymen alike may innocently succumb to the solicitations and testimonials of those who stand to benefit most by filling their money bags. If any of the nostrums so blatantly advertised were beneficial, would it not be naive to believe that prejudice alone had prevented their use? Would all the famous people who have died of cancer have chosen death rather than using the "cure"? For anyone who is familiar with the desperation and grasping for therapeutic straws in their struggle against impending doom, the only answer is a resounding "No!"

CONCLUSION

No case of cancer is ever so bad that nothing can be done for it. The physician can do much for any cancer patient. His interest, sympathy, and understanding will endear him to the patient and the patient's family. On the other hand, a negligent attitude will engender antagonism and often drives the hapless but hopeful victim of cancer into the waiting and optimistic hands of the unprincipled charlatan who not only promptly divests him of his money, but destroys any remaining chance of utilizing known and approved agents of therapy.

SUMMARY

A review has been presented of some of the pitfalls in the management of cancer patients which may ensnare the well-intentioned but too often uninformed physician. The great improvements made during the past decade have been noted. It is urgent that every physician avail himself of information concerning the use of the newer approaches to the more effective therapy of neoplastic diseases. It has been emphasized that by a more sympathetic and well-informed approach to the cancer patient's problem, the number of patients turning to the cancer quack will be diminished.

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A Comparison of the Radioactive Iodine Uptake Test with Other Laboratory Methods Used in the Diagnosis of Thyroid Disease*

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INTRODUCTION

Since rational therapy depends on accurate diagnosis, any aids to more precise diagnoses deserve careful consideration. All diseases may be looked upon as belonging in one of two groups. In the first group are those diseases defined in terms of an objective laboratory test or examination. For example, a biopsy specimen from the abdomen of a woman may prove to be adenocarcinoma and regardless of any correlation with clinical signs and symptoms the diagnosis is still cancer. In the second group are such diseases as hyperthyroidism. Hyperthyroidism is a clinical diagnosis made only after careful consideration of history, physical examination, and the results of one or more laboratory tests. Unless some test is discovered in terms of which hyperthyroidism can be defined, its diagnosis will always remain a problem of clinical judgment.

The same situation pertains to the diagnosis of hypothyroidism; probably here the confusion and difficulty are even greater. The diagnosis of other thyroid disorders involves clinical judgment supported by such laboratory findings as may be available.

DIAGNOSIS

From the foregoing it is obvious that the diagnosis of thyroid pathology may be exceedingly difficult. Because of these difficulties much attention has been given to finding laboratory examinations that would be of value. The tests commonly used today have been reduced to the following four:

1. Determination of basal metabolic rate (BMR)
2. Determination of fasting serum cholesterol
3. Determination of protein bound iodine (PBI)
4. Determination of I^{131} uptake.

An ideal test for thyroid function should have the following features:

1. Accurately detect hypofunction as well as hyperfunction quantitatively
2. Be uninfluenced by exogenous factors as diet, state of activity, fasting, medication, et cetera
3. Require minimal patient cooperation
4. Result in minimal patient discomfort
5. Require no preliminary patient preparation
6. Be simple enough to be performed with dependable results by a technician
7. Be inexpensive
8. Require a short time for its performance
9. Require only a modest financial investment in equipment
10. Be immediately available without involved preliminary preparation
11. Test thyroid function directly rather than by an indirect method
12. Result in no injury immediate or remote to the patient
13. Be sufficiently standardized that results from laboratory to laboratory are comparable
14. Be free of false results which might arise from pathologic conditions only remotely, or not at all, related to thyroid disease
15. Be able to differentiate hypothyroidism due to direct primary thyroid failure from that due indirectly to pituitary failure
16. Be repeatable without harm to the patient and with minimal inconvenience, so that the results of therapy can be followed.

It is obvious that none of the four tests mentioned fulfill all of the criteria for the ideal procedure.

BASAL METABOLISM TEST

The test for the basal metabolism rate is the most common test for thyroid function. Determination of the BMR is usually done by a technician whose training, ability, and conscientiousness may vary between wide limits. No other test of thyroid function depends so much for reliability upon satisfactory rapport between examiner and examined. In this test, moreover, one must—except in the case of hospitalized patients—take patient cooperation for granted. Experience leads me to feel sure that not a few patients regard the physician as being a bit stuffy when he admonishes them not to eat, drink, smoke, or even wash their teeth before reporting to the laboratory for a BMR determination. After all, reason some of our patients, how can a cup of black coffee and a cigarette make much difference? One may summarize the defects of the BMR determination as follows:

1. Technical perfection may be lacking on the part of the one who gives the test.

2. Patient cooperation must be assumed until arrival at the laboratory.

3. Patient cooperation after the test starts varies with temperament of the patient, skill of the technician, and other factors.

4. Apparatus errors are numerous. Old soda lime, hose leaks, poor-fitting mouthpiece, insecure nose clip, et cetera, may introduce large errors.

5. The tables from which final calculations are made may be inaccurate for excessive leanness, obesity, youth, and old age.

6. The test does not measure thyroid function directly.

7. Many conditions besides hyperthyroidism or hypothyroidism can cause markedly abnormal results,[1] for example: (a) hypertension, (b) leukemia, (c) psychoneuroses, (d) tuberculosis, (e) any febrile condition, (f) polycythemia, (g) lymphoblastoma, (h) acromegaly, (i) heart disease with dyspnea, (j) pheochromocytoma, (k) coarctation of the aorta, (l) Parkinson's disease, (m) chronic alcoholism, (n) aortic stenosis.

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In conclusion it seems safe to assume that the reliability of the BMR may vary from 50 to 80 per cent.[2-4]

SERUM CHOLESTEROL TEST

Fasting serum cholesterol assay is another indirect method devised to indicate something of thyroid function. Various methods for its determination result in different values for normal ranges. Here again physiologic and pathologic states unrelated, or remotely related, to thyroid function may cause marked variations in the results. Such conditions as diabetes mellitus, the nutritional status, and variations in pituitary and adrenal activity may markedly alter cholesterol levels. The correlation between hypothyroidism and serum cholesterol appears to be of limited value but the correlation with hyperthyroidism is so vague as to be useless. Peters and Man[5] summarize their findings in a large series of determinations as follows: "Cholesterol is of no aid in the detection of overactivity of the thyroid. Although it rises in outspoken uncomplicated hypothyroidism, its concentration is not correlated with the degree of thyroid deficiency."

Hurxthal[6] summarizes the probable accuracy of BMR and cholesterol determinations as follows:

1. One case in two with BMR below –20 may be due to myxedema.
2. Four cases out of ten with a blood cholesterol over 300 mg. may be due to myxedema.
3. Two cases of myxedema out of every 100 may have a normal metabolic rate of –10 to +10.
4. Five of every 100 cases with myxedema may have a normal cholesterol (range 160 in childhood to 260 in old age).
5. Nine patients of every ten with a metabolic rate below –20 and a cholesterol over 300 mg. probably have myxedema.

PROTEIN BOUND IODINE TEST

Protein bound iodine (PBI; or serum precipitable iodine, SPI) is a valuable method for detecting variations in thyroid activity. Aside from inherent limitations of the method, its chief drawback lies in the time, skill, and apparatus necessary for its determination.

Because of variations in technic each laboratory should establish its own range of normal values. In general the range will fall from 4 to 8 micrograms per 100 cc. If one recalls that a microgram is but one millionth of a gram one can readily appreciate the difficulty of reliable assay by methods applicable to the clinical laboratory.

The chief advantage of the test lies in the fact that it is a direct test which measures the amount of hormonal iodine in the blood. In hypothyroidism the small amount of hormonal blood iodine is revealed by low PBI values, and in hyperthyroid states high PBI values indicate the excessive secretion of the hormone. The values of the PBI determination closely parallel the clinical status of the patient.

The chief disadvantage of the test lies in the fact that the ingestion of exogenous iodine in any form may result in misleading figures.[7] The number of iodine-containing materials which may have been injected into or ingested by the patient is considerable. Man and Peters[8] report that Priodax, tetraiodophthalein, Diodrast, and Lipiodol may elevate and hence invalidate PBI values for considerable periods. Large doses of inorganic iodine likewise cause misleading results.[9] The inorganic forms of iodine elevate the nonspecific inorganic iodine levels of serum or plasma, and also give abnormally high values to the PBI determinations. These elevated values of blood iodine are not accompanied by any evidence of increased metabolism.

Some types of hormonal therapy for conditions having no well-known relation to the thyroid diseases influence PBI values. It has been demonstrated that the use of ACTH or cortisone in patients being treated for a variety of collagenous diseases is followed by low PBI values.[10] A paradoxical situation pertains in the case of the administration of iodothiouracil for hyperthyroidism. While the material is clinically effective and the patient improves, values for the PBI increase—sometimes to values over 100 micrograms.[11] The use of iodized salt appears to be without significant influence on the reliability of PBI values.

If the precautions against the intake, by any route, of exogenous iodine and other substances known to influence the test are observed and the laboratory technic is completely reliable, the use of PBI determinations is a valuable procedure for the diagnosis of thyroid disease and for following the response to therapy.

THE RADIOACTIVE IODINE UPTAKE TEST

The latest and an increasingly popular test for thyroid function is the determination of iodine uptake by the use of radioactive iodine, specifically I^{131}.

Physiologic Basis.—Studies by Riggs[12] indicate that under normal circumstances at least 80 per cent of the body iodine is stored in the thyroid. Ingested iodine, in usual amounts, is very rapidly absorbed by the gland, and the rate and amount absorbed depend on the activity of the gland.

Accurate measurement of the rate and amount of ingested iodine absorbed by the gland would constitute the most direct and reliable method yet available for determining the activity of the thyroid. Radioactive iodine offers a means of making these determinations.

Physical Basis.—Iodine, as it exists in nature, has an atomic number of 53 and a mass number of 127 and is stable. Modern atomic technology, however, has resulted in the production of fifteen other isotopes, and possibly a sixteenth, of the element iodine.[13] All isotopes of iodine except naturally occurring I^{127} are radioactive. Of the various manufactured isotopes of iodine, one, I^{131}, has properties that admirably fit it for use in biologic experimentation, diagnosis, and therapy.

This isotope has a half-life of 8 days, which permits unhurried experimentation. This rate of decay does not prolong exposure to excessively dangerous radiation intensities.

In decaying to the inert gas xenon, two beta particles and four gamma photons are liberated. Most of the energy of this transformation is accounted for by the beta particles. The range of the beta particles in tissue is about 2.2 mm.[14] The gamma radiation (maximum 0.638 Mev.) is probably insufficient in intensity, in the usual dosages, to cause significant radiation damage. This gamma radiation, however, makes it possible to detect how much iodine is present and where it is. The unique feature of this detection lies in the fact that the apparatus does not touch the patient but measures the gamma radiation issuing from his or her body. A certain proportion of the emerging gamma radiation is quantitatively detected, and by comparison with a standard the per cent of the ingested iodine at any location in the body may be calculated.

Theoretical Dangers.—All ionizing radiation is destructive to cells. The possibility of radiation damage

to the thyroid or other tissues must, therefore, be considered. With the conventional Geiger-Müller counters, doses of 50 to 250 microcuries were common in diagnostic procedures. If not repeated too frequently these doses appeared to be without significant damaging effect. The use of wide-angle scintillation counters has increased the sensitivity of the detection as much as 94 per cent over the conventional end-window Geiger-Müller tube and has permitted decreasing the dosage of I^{131} to 1 to 10 microcuries without sacrifice of accuracy.[15] Many x-ray diagnostic procedures in common use deliver more radiation to the patient than do I^{131} uptake studies. Low dosages also safely allow more frequent tests so one may more accurately follow the progress of therapy.[16]

Technic of the Test.—The patient presents himself at any time convenient to the laboratory and is given a capsule containing 1 to 10 microcuries of I^{131}. He need not be fasting. Uptake counts may then be run any time after 2 hours. Counts at 1 hour may give erroneous results because a full stomach may slow down absorption. For determination of per cent uptake for the diagnosis of hypothyroidism or hyperthyroidism, counts are taken at 4-, 6-, or 24-hour intervals after taking the capsule. Our routine is to give 5 microcurie doses to adults, 2.5 microcurie doses to children, and make our counts in 24 hours. In our laboratory the patient is seated in a reclining chair and the scintillation counter placed 8.5 cm. from the skin with its center as nearly over the center of the thyroid isthmus as possible. A 2-minute count is made and repeated if indicated. Counting is done over the thigh in a similar manner, to obtain the net thyroid count. The count is then obtained from the standard, using geometry as nearly the same as possible as that used for the thyroid count. From this is subtracted the room background count. The per cent uptake of the thyroid is: $\frac{\text{net thyroid count}}{\text{net standard count}} \times 100$. We regard uptakes of 15 per cent to 35 per cent as being within the normal range.

Factors Which Introduce Error into the Test.—Iodine in any form ingested or externally applied causes low uptakes lasting as long as 12 weeks.[17] Such agents as Lugol's solution, iodine-containing cough syrups, iodine-containing oils and dyes used in diagnostic radiography, externally used tincture of iodine or ointments, and inorganic iodine as sodium iodide—all lower the uptake. Iodized salt in usual amounts seems to introduce no error. Desiccated thyroid also lowers uptake values. Thyrotoxicosis factitia may be detected by a low I^{131} uptake and a high PBI. The suppression that results from thyroid medication may persist 12 weeks.

The effect of antithyroid drugs appears to differ with the mechanism by which the drug acts. Rats given potassium thiocyanate took up an average of 153 per cent more I^{131} than did controls. Thiouracil, however, depressed the uptake to an average of less than 18 per cent of that found in untreated animals.[18]

Thyrotropic hormone (TSH) in doses from 10 to 60 mg. sharply increases I^{131} uptake as well as elevating the BMR and PBI values.[19] The use of TSH to distinguish primary (thyrogenous) and secondary (hypopituitary) hypothyroid states has been investigated.[20,21] In primary thyroid failure the pathology resides in the gland's inability to absorb iodine and synthesize or excrete thyroxin. In hypopituitarism the gland is capable of performing its function but fails to because no TSH is formed and consequently the gland is deprived of its natural stimulus.

I^{131} uptake is deficient in both instances. If, however, TSH is given and the I^{131} uptake returns to normal, it may be concluded that the fault is not with the thyroid but lies with the pituitary. If TSH fails to elevate I^{131} uptake one is justified in concluding that the primary pathology resides in the thyroid itself.

Propylthiouracil inhibits or depresses, depending on dosage, I^{131} uptake.[22] The effect persists for some time after discontinuance of the medication.

EVALUATION OF THE TEST

The I^{131} uptake test is most accurate in the diagnosis of exophthalmic goiter (Graves' disease) and adenomatous goiter with hyperthyroidism. It gives significant results in myxedema.

Depression of I^{131} uptake has been reported in a few conditions not closely related to thyroid function such as renal insufficiency, cardiac decompensation, and Addison's disease.[23]

In a comparative evaluation of the BMR, PBI, and I^{131} uptake, Jaffee and Ottoman[24] report that the I^{131} uptake was 95 per cent accurate, the PBI test gave 80 per cent accurate results, and the BMR was 67 per cent accurate.

SUMMARY OF THE ADVANTAGES OF THE I^{131} UPTAKE TEST

The I^{131} uptake test is equal to, or exceeds in accuracy, any other single test for thyroid function.

It appears not to be influenced more than other thyroid tests by exogenous factors.

It requires minimal patient cooperation.

No patient discomfort attends the use of the test.

No preliminary preparation such as fasting or resting is required.

Of all four of the conventional tests for thyroid function the I^{131} uptake requires the least training for accurate performance.

Once the equipment is available, the test is less expensive, in time and material, than are other tests.

The equipment requires essentially no maintenance except the occasional replacement of a vacuum tube; it is immediately available for use after a 45 to 60 minute warm-up period.

There is no evidence that this author can find that doses of I^{131} in doses up to 10 microcuries, repeated as often as necessary to follow a case, will cause any immediate or remote harm to the patient. In a 10-microcurie dose of I^{131} there is less than a millionth of a gram of I^{131}.

The I^{131} test is less influenced by nonthyroid pathology than are the other tests for hyperfunction.

Now that capsules containing the specified dosage are commercially available minimal equipment, training, and time are required for the test.

SUMMARY OF DISADVANTAGES AND POTENTIAL DANGERS OF THE I^{131} UPTAKE TEST

At present the requirements of the Atomic Energy Commission necessitate an isotope committee wherever radioactive isotopes are used. This committee consists of a hematologist or a pathologist skilled in hematology, an internist, and a licensed physician who has had a minimum of 3 months of training in the use, measurement, assay, and health protection aspects of the isotopes to be used. In addition, a radiologist on the committee is desirable, and a health physicist must be available as a permanent member of the committee or on a part-time consultation basis. It seems that some

of these restrictions are certain to become less rigid for laboratories using but 50 to 100 microcuries a week of I^{131} packaged for diagnostic use. The minimum apparatus essential for the simplest diagnostic laboratory will cost in the neighborhood of $1,500.

During pregnancy the fetal thyroid begins to form colloid by the twelfth or thirteenth week, and iodine is taken up by the gland after the fourteenth week.[25] There is, therefore, a competition between the fetus and mother for ingested iodine which would introduce error in uptake studies. There is also the remote theoretical possibility that the radioactivity of the I^{131} might prove harmful to the developing fetal thyroid. Since no one knows the answer to this problem, possible legal entanglements would be avoided by refraining from exposing the pregnant woman to any ionizing radiation unless indicated by some emergency situation.

USE OF THE TEST AT COLLEGE OF OSTEOPATHIC PHYSICIANS AND SURGEONS

The College was authorized by the Atomic Energy Commission to use I^{131} diagnostically in December, 1953, and on January 10, 1955, was authorized to use this material for thyroid therapy. Patients are from the college clinic and also are referred by private physicians. In addition to the tests on patients, a considerable number of tests have been run on apparently healthy college students as controls. Figure 1 shows, on a composite graph, the results of I^{131} uptake studies on 25 male college students. These students range in age from 20 to 28 years. All were presumably in good health. Uptake was determined from 1 hour to 96 hours, inclusively. The 1-hour results ranged from 1.6 per cent to 7.7 per cent, and on repeated trials with the same individual varied so much as to preclude the possibility of using a 1-hour uptake value for routine diagnostic use. These inconstant results were presumed to be due to varying rates of absorption from the stomach caused by ingestion of food shortly before or after the test. The I^{131} was administered to student controls between 12:00 noon and 1:00 p.m.; many had just finished lunch, and others ate immediately after taking the radioiodine.

If 1-hour uptakes could be relied upon to express accurately the condition of the thyroid it would allow the entire test to be completed in less than 1½ hours and would make it unnecessary for the patient to come to the laboratory more than once.

The middle curve labeled "Average uptake" is the arithmetical mean of all twenty-five readings for each time period. The position of this curve, almost halfway between the highest and lowest values, indicates that

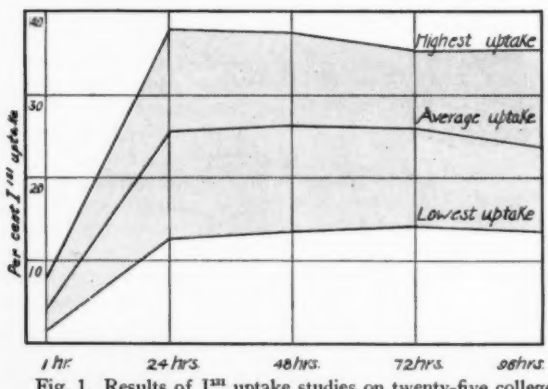

Fig. 1. Results of I^{131} uptake studies on twenty-five college students from 1 to 96 hours, inclusive.

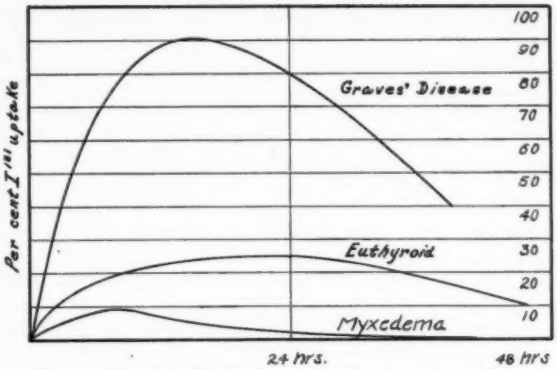

Fig. 2. Typical I^{131} uptake curves in hyperthyroidism, in myxedema, and in a normal individual.

the sample was large enough to give significant results. The amount by which the upper and lower curves at 24 hours are above and below 15 per cent and 35 per cent should be noted. These figures are regarded as being the upper and lower limits of normal; two controls, or 8 per cent, were 1.5 per cent above the upper normal value, and one student, or 4 per cent, was about 1.2 per cent below the lower limit.

Figure 2 shows typical uptake curves for individuals. The upper curve shows the I^{131} uptake of a female, aged 31, with a classical textbook picture of Graves' disease. Her I^{131} uptake was the highest recorded in our laboratory, 91 per cent; her BMR was +55 per cent; and her PBI was 12.7 micrograms per 100 cc.

The middle curve is typical of a euthyroid individual, and the lower curve represents the uptake in a case of untreated postsurgical myxedema.

Other clinics have established uptakes of 15 per cent to 35 per cent as representing the normal range. Not all of our patients, and none of our student controls, have had simultaneous PBI, BMR, and I^{131} uptake tests.

The greatest discrepancies occurred between BMR values and the other two tests. One patient had a BMR of −16 per cent, an I^{131} uptake of 30.9 per cent, and a PBI of 7.8 micrograms. In general, however, the correlation between BMR and the other two tests in our series is closer than that reported by most laboratories.

Our use of the scintillation counter has allowed satisfactory results with doses of 2.5 microcuries for children and 5 microcuries for adults. We routinely use a skin-to-probe distance of 8.5 cm. and arrange the geometry for counting the standard accordingly. Although we receive our I^{131} in capsules in standardized 5-microcurie doses from a highly reliable source, we check each batch against a simulated I^{131} standard.

We supply the referring physician with standard forms as shown in Figure 3, so that all relevant data will be available. The results of the test are reported on the form shown in Figure 4.

If the patient has been on any iodine-containing medication or has undergone any x-ray examination involving the use of any iodine-containing substance, we insist on a 7-week waiting period after the last contact with the iodine-containing substance before doing an uptake study. We feel that patients who have been taking desiccated thyroid or antithyroid drugs must wait 3 weeks after discontinuing the medication

REFERRAL FORM FOR I^{131} THYROID UPTAKE
Please typewrite or print!

Patient's name.....Age.....Phone No.....
Address.....
Male (.....) Female (.....)
Referred by.....Phone No.....
Address.....
Brief statement of clinical condition or suspected diagnosis:
.....
.....
.....
.....
Present therapy and medication:
Desiccated thyroid (Yes.....) (No.....) Date last dose.....
Antithyroid drugs (Yes.....) (No.....) " " " .....
Iodine-containing drugs (Yes.....) (No.....) " " " .....
TSH (Yes.....) (No.....) " " " .....
Other hormones (state which)
(Yes.....) (No.....) " " " .....
Is patient pregnant? (Yes.....) (No.....)
Date last menstrual period began.....
Has there been a previous BMR?.....
If yes, give date.....and result.....
Has there been a previous PBI?.....
If yes, give date.....and result.....
Signature of referring physician: .....
(No examination will be made without this signature.)

Fig. 3 This form is filled out by the physician who refers a patient to the clinic for an I^{131} uptake study.

before an uptake determination will be reliable. We prefer, in the interest of ultra conservatism, to repeat the test no more frequently than once every 3 months. Under some circumstances we will do the test every 2 months for a few times. If the test were done every 2 months for a year only 30 microcuries of I^{131} would be ingested, an amount considerably less than was once routinely used as a single dose. It takes from 6 to 8

REPORT ON THYROID UPTAKE OF I^{131}
Name of patient.....Phone No.....
Address.....
Referred by.....Phone No.....
Address.....
Dose No.....Hour uptake.....
Date given .....Hour given.....
Standardization No. 1:
Date.....Hour.....Gross C/M.....Background.....Net C/M.....
Standardization No. 2:
Date.....Hour.....Gross C/M.....Background.....Net C/M.....
Counting Head Type: Scintillation, G-M) Distance.....cm.

	Gross C/S	Background	Net C/S
Thigh background	.....	.....	.....
Thyroid:	.....	.....	.....

Remarks: .....
.....
.....
.....
Per cent uptake.....
Note: According to current thinking, per cent uptakes from 15-35% are considered in the normal range.

Fig. 4. The results of the I^{131} uptake study are reported to the referring physician on this form.

half-lives for a radioactive substance to decay to harmless levels and 60 days is somewhat over seven half-lives for I^{131}. Consequently, each dose has decayed to practically no activity between doses so the possibility of continuous irradiation, even at low intensities, is essentially nil.

CONCLUSIONS

At the present time the I^{131} uptake appears to be the best single test for thyroid function available. Like most laboratory examinations, however, it is useful only as a supplement to a carefully taken history, a complete physical examination, and sound clinical judgment.

1721 Griffin Ave.

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Visceral Pain as Considered by the Neurosurgeon

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The understanding of the causes and the recognition of visceral pain have always been a vexing challenge for reasons which are finally and belatedly being clarified. This discussion will be limited to syndromes involving visceral pain which commonly and jointly confront both the general surgeon and the neurosurgeon. Specialization within departmentalized institutions tends to limit the general surgeon to the abdominal and pelvic organs. For practical purposes this discussion will concentrate upon painful viscera of these regions.

The neurosurgeon must always be alert to the fact that visceral disease may simulate peripheral neural disorders such as segmental neuralgia. Conversely, the general surgeon must fully respect the fact that lesions of the nervous system may superficially mimic visceral disease. Failure to make distinction between visceral disease and painful viscera resulting from neural dysfunction has led to unnecessary operations upon abdominal and pelvic organs. This may be partly due to the accessibility and presumed expendability of these organs. Needless to say, the neurosurgeon would be likely to make similar and equally frequent operative attacks upon innocent tissue were the nervous system readily accessible and expendable.

Cope[1] stated: "One is accustomed to marvel at the accurate diagnoses of the neurologist, which are for the most part based upon a sound knowledge of microscopic anatomy. Nothing like the same accuracy is yet achieved in abdominal diagnosis, but it is the writer's faith that such will come in time by carefully applying the knowledge of anatomy and physiology."

If, as Cope suggests, the neurologist and the neurosurgeon are more efficient than the general surgeon in arriving at correct diagnoses, such superiority may well derive from the obstacles placed by nature in the way of the neurosurgeon rather than from diagnostic acumen predicated upon superior industry. Many of us perform best in the presence of obstacles, and the neurosurgeon is confronted by an operative field which, because of its comparative inaccessibility, imposes diagnostic hindrances which demand the best of him without the benefit of exploration. Furthermore, structures uncovered by the neurosurgeon may not be casually sampled or removed except to the patient's subsequent disadvantage. In the past few years certain laboratory procedures designed to aid the neurologist and the neurosurgeon have become so efficient it is quite possible that neurologic clinical examinations may undergo deterioration.

Personally I do not believe that, because the abdominal and pelvic viscera are more easily exposed than is the nervous system, the general surgeon would be influenced to neglect proper presurgical diagnostic care. Nor do I feel that the urge to sample viscera would necessarily lead to an exploratory laparotomy for the purpose of obtaining the pathologist's opinion. However, the temptation to explore accessible organs for histopathologic study will always exist unless psychologic barriers against such conduct are erected and respected. Such barriers usually are unnecessary in the field of neurosurgery because of nature's obstacles in the form of the skull and the vertebrae. Perhaps nature had less confidence in the neurosurgeon's surgical integrity than in that of the general surgeon! If such is the case the general surgeon should avoid religiously any betrayal of the trust.

While it is inconceivable that any member of the College of Osteopathic Surgeons would explore or sample any part of the body in the hope of pathologic justification simply because of the ease of exposure, it is conceivable that such might occur because of diagnostic confusion concerning the etiology of visceral pain. It appears that there is little hope for the complete resolution of the mysteries of visceral pain in our lifetime, but recent investigations have disclosed a field of neurology which gives promise of becoming one of the most fascinating of human physiology. For example, Fulton[2] describes a "visceral brain" confined principally to the limbic area of the brain and chiefly concerned with visceral sensations including pain. This limbic complex has little to do with higher intellectual functions which seem to be concentrated in the neocortex. Both, however, are to be found in the frontal lobe. Fulton also describes separate spinal cord pathways of autonomic afferents which could be termed a spinohypothalamic system.

From a practical viewpoint Pool[3] has shown that this visceral brain is capable of interpreting visceral pain. Furthermore, if irritated or diseased, this visceral brain may register spurious sensations of visceral pain in the absence of visceral disease. It has been known for a long time that focal brain lesions such as those seen in the small stroke syndrome may give rise to spurious symptoms of a heart attack, an abdominal catastrophe, or genitourinary disorders. Deep seated intracranial neoplastic disease has also long been known to give rise to false symptoms of visceral dysfunction. Meanwhile, it has been realized for many years that frontal leukotomy represents an effective surgical maneuver for the relief of intractable visceral pain. Theoretically it should now be possible to alter the visceral brain specifically for this purpose without incurring concomitant sacrifice of the patient's intellectual capacity. It may be that this expanding knowledge of cerebral functions and topography will eliminate what has heretofore been labeled psychogenic visceral pain in favor of an irritative lesion of the limbic complex.

We have all been impressed with the important role of the autonomic nervous system in pain mechanisms, particularly in connection with visceral pain. Surgical alterations of the autonomic nervous system have been generally more successful than chordotomy of the spinothalamic tracts or attacks upon the peripheral nerves. Even greater success may be anticipated through specific surgical interruptions of autonomic afferents of the cord and also by ablations of definitive zones of the limbic complex (visceral brain).

The observations of Leriche[4] that the autonomic nervous system must be intact and functioning for pain to be perceived were unquestionably valid, although at the time these observations were made the necessary central nervous system pathways for such representations were not known. In spite of the fact these recent

neurophysiologic studies are exceedingly stimulating, they are far from complete, and their clinical application is as yet experimental. They should, however, cause a rude awakening regarding the complexities involved in the interpretation and differentation of visceral pain. As previously stated, the general surgeon must always be alert to the capacities of the nervous system either to produce or simulate visceral disease or pain. In order to make the necessary distinctions prior to operation he needs to be a fairly competent clinical neurologist. Similarly, the neurosurgeon should studiously acquaint himself with the criteria of specific visceral disease in order to avoid diagnostic pitfalls.

The problem of visceral pain and its complexities should serve as an excellent intellectual exercise for all surgical trainees. It should deter the tendency of specialists to stake claims on anatomic systems or areas with a resultant loss of interest in and knowledge about integrated systems. Needless to say, the specialist should restrict his professional activities in accordance with ethical and organizational definitions, but no "system" restrictions should be imposed upon diagnostic procedures. Intellectual gymnastics are in order even though the amount of information about visceral pain is too limited to warrant concrete convictions or applications; nonetheless it is sufficient to stimulate interest and to increase the index of suspicion. Surgical error due to inadequate information will continue to exist, but error due to misinformation is inexcusable and malignant when the way is open to its remedy.

I suspect that currently untenable concepts of visceral pain have hung on past any acceptable physiologic justification or clinical application. This indictment applies to invalid tenets which are still presented as sound by some schools. One such concept is known as the Head-Mackenzie theory of referred pain which is sometimes spoken of as Head's law. This concept postulates that pain is not felt directly in the viscera but is relayed to an area of "higher sensibility" via the closest central connection and that the reference of painful stimuli from viscera provokes a commotion or excitatory state within the spinal cord after which the stimuli are switched to the peripheral nervous system and other body wall structures (soma). Theoretically this expansion of stimuli from the involved viscus may be associated with hyperesthesia and muscular rigidity.

When an attempt is made to apply Head's theory in clinical diagnostics, the presence of topographic pain, hyperesthesia, muscular rigidity, and tenderness may be misinterpreted as evidence of intrinsic visceral disease whereas, more often, they represent some pathologic process of the somatic nervous system.

It has been convincingly demonstrated that viscera are capable of being specifically painful by means of a separate autonomic afferent and brain system. If hyperesthesia and muscular rigidity are encountered they may be due to serosal irritation, and they are perceived without the need of a viscerosomatic reflex. Furthermore, the idea that an impulse which has come from a viscus undergoes a certain switching toward the periphery through a spinal segment is not physiologically sound. Pain is always perceived in the brain, and any switching of painful impressions to the periphery would have to come from the brain and not the spinal cord. Contrary to the Head-Mackenzie concept, it is not the function of the spinal cord to send out any painful sensations, and any such phenomenon is never more than an apparent cerebral effect. Actually, sensory stimuli do not leave the cerebrum. The cerebrum, in regard to the sensation of pain, is responsible only for the creation of a mental concept. It is true that visceral pain may be frequently misinterpreted as somatic pain, but this misinterpretation most likely represents a faulty cerebral localization rather than a commotion in the spinal cord with actual reference by way of the corresponding somatic segment.

Inasmuch as painful or other visceral sensations are much less common than somatic sensations, it is only natural that the cerebral interpretive areas, because of a lack of familiarity with visceral sensory stimuli, may fail to interpret correctly the origin of the disturbance. This is particularly true in the case of patients not accustomed to visceral disease or pain. The entire problem appears to be linked with habit and the process of conditioning, augmented by the fact that viscera are not endowed with positional sense. However, when misinterpretation occurs, it will be found by careful examination that the apparent somatic sensory alteration does not correspond to any strict segmental or dermatome distribution. Almost always it will prove to be inconsistent with any pattern that might be expected of any true segmental disturbance.

Lewis[5] presents the argument that if true visceral pain is referred to somatic structures on the basis of the Head-Mackenzie theory, the reverse should also be possible. He states that such is not the case. He says that it is also difficult to accept this hypothesis of spread within the cord since there is no segmental spread when skin is stimulated. No matter how strongly a point of skin is stimulated, there is very little diffusion of pain arising from it, and, if pain seems to diffuse, it does so radially and equally. The reason that pain impulses derived from skin do not set up this supposed commotion in the cord seems to be that the commotion is hypothetical and that reference is a phenomenon which accompanies inability to localize.

Taking issue with the validity of the Head-Mackenzie theory of referred pain in favor of cerebral misinterpretation or failure of localization is of sufficient academic interest to warrant discussion. Adherence to the Head-Mackenzie theory can lead to numerous diagnostic errors wrongly implicating uninvolved viscera. It is conceivable that the surgeon's endorsement of Head's law may have obscured appreciation of the capacity of the somatic nervous system to simulate visceral disease. It may do so in a variety of conditions including encroachment upon the spinal nerves by tumor, herniated intervertebral disk, and structural disorders answering the description of osteopathic lesions.

Herniated lumbar disks seldom are productive of symptoms to be misinterpreted as reverberations of visceral disease because the sensory distribution usually does not conform to visceral topography. However, herniated thoracic disks or other encroachments upon the thoracic radicles giving rise to segmental neuralgia are commonly misdiagnosed as repercussions of visceral disease. If the surgeon is insufficiently familiar with the clinical features of segmental neuralgia, an unfortunate diagnostic dilemma may occur. Such a situation is doubly unfortunate if the surgeon endorses Head's law and, on the supposition that the symptoms of segmental neuralgia may be a somatic expression of visceral disease, operates on the patient.

Judovich and Bates[6] have concluded that the Head-Mackenzie theory is clinically unreliable and un-

satisfactory. It is their experience that errors in diagnosis attributable to the acceptance of the theory have favored misinterpretations of the symptoms of segmental neuralgia as evidence of visceral disease rather than the opposite.

There are certain differential criteria which are not intricate or time-consuming by means of which distinction may be made so as to avoid such diagnostic errors. First, the distribution of the pain should correspond to a true dermatome pattern, if the cause is somatic (segmental neuralgia)—a circumstance not demonstrated in the case of faulty cerebral localization of true visceral pain. Second is the demonstration of skin tenderness accompanying distribution of the pain. This segmental tenderness may be either superficial or deep and may be elicited either by pinching the skin (superficial type) or by poking the skin firmly against subjacent firm structures such as muscle or bone (deep tenderness). If either superficial or deep tenderness accompanies the distribution of the pain, the disorder is usually due to irritation of the nerve roots, ganglia, or trunks of the spinal sensory nerves. Thus it is not due to pain impulses originating in diseased viscera. In other words, the segmental tenderness of the skin is due to a lesion of somatic location rather than some pathologic condition of a viscus. If segmental cutaneous pain or tenderness can be elicited, the examiner should abandon consideration of visceral disease as a cause until a possible somatic neurologic reason for the complaint has been eliminated. This distinction may involve x-ray studies with the use of contrast media to eliminate the possibility of the presence of spinal space-occupying lesions such as tumor or herniated disk. In other instances in which structural defects may be a factor, postural correction, manipulation, or paravertebral procaine blocks may be necessary to make the differentiation.

Obviously most of the pain syndromes due to lesions of the somatic nervous system which may lead to confusion with those of visceral origin are not of the type seen in visceral surgical emergencies. Thus the clinical picture is not that of the so-called acute abdomen. Usually in instances of diagnostic confusion leading to surgical exploration of abdominal or pelvic organs without the demonstration of visceral disease, operation is of the elective variety. However, the pain of segmental neuralgia may be quite distressing and may be of sufficient intensity to make the patient ready prey for any procedure, elective or otherwise.

It has been said that failure to make a correct diagnosis may be due either to lack of familiarity with the disease or the failure to think of it. I suspect that the failure to recognize segmental neuralgia with the resultant false indictment of uninvolved organs derives from the surgeon's lack of acquaintance with the criteria of a segmental neuralgia. This is a matter of inadequate information which is easily corrected. A much more difficult educational problem is that of unlearning misinformation.

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Indications for and Use of Drains in the Abdominal Cavity

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In 1947, in reviewing our residency-teaching program at the Kirksville Osteopathic Hospital, we became aware of the need to formulate indications for the use of drains in the abdominal cavity. In talking with surgeons, we found that in many cases the indications for draining the peritoneum depended largely on the common-sense judgment of the surgeon. Some even stated a hunch was their indication for the use of a drain. This indication perhaps works well for the man of experience whose hunch depends upon valid indications long since forgotten yet buried in his subconscious mind. However, for the teaching of the resident in surgery, the importance of having definite guideposts to influence his thinking and judgment was recognized. In a search of the literature and a synthesis of our own experience for an answer to the problem, we at the Kirksville Osteopathic Hospital adopted the principles for draining the peritoneal cavity given by Harvey[1] of the Presbyterian Hospital and the College of Physicians and Surgeons, Columbia University, and have used them as a guide in teaching and practice. I do not claim originality in this paper but simply wish to discuss drainage and its indications in surgery of the abdomen, in the hope that the discussion will be useful to other teachers of and residents in surgery.

The purpose of a drain is to keep the wound open to the outside until the danger of infection or anticipated infection in the depths of the wound is past and/or to permit a wound to heal without troublesome accumulation of body fluid within it. Yates[2] stated these fundamentals in 1905.

The disadvantages of drains are many, and it must be kept in mind that the drain is a foreign body lowering local resistance to possible infection and also providing an avenue whereby skin organisms may enter.[3] Hence, a drain predisposes to infection and should be used only where actual indication exists. The drain also stimulates the process of inflammation and repair of the peritoneum which can result in very troublesome adhesion formation. As in the case of any foreign body, a drain becomes surrounded by a fibrinous peritoneal exudate which organizes to wall off the drain from the rest of the abdomen. Ilgenfritz[4] stated that "As a result, drains do not actually drain an area but cause it to be walled off from the peritoneal cavity by promoting the formation of limiting adhesions." It fol-

lows then that, if the drain has walled off the infected area, it will furnish the avenue of escape for the exudate by the formation of a sinus tract to the outside.

Drains improperly used may cause harm. Since drains are foreign bodies, in the presence of infection they may become infected foreign bodies. If the drain is permitted to remain too long, it will serve to maintain the infected area. This may result in overproduction of infected granulation tissue with excess scar formation and prolonged and weak wound healing.

Gauze should not be permitted to protrude from the end of a cigarette drain into the abdomen. Gauze tends to adhere to the tissue, first because of fibrin and secondarily by the ingrowth of granulation tissue. Drains, especially the heavier and harder variety, tend to produce pressure necrosis when placed in contact with viscera or tissues of low vascularity. Fecal fistulas may thus be produced.

A drain should not be permitted to touch a suture line. It interferes by disturbing the process of inflammation and repair. According to Hertzler,[5] it causes an outpouring of serum from the suture line and is more likely to establish a fistula.

Drains in the peritoneal cavity should be so placed that they lie along lateral peritoneal walls and do not come in contact with or pass through coils of small intestine.[6] In order to minimize adhesions, the drains should be passed along the lateral abdominal wall, above the transverse colon, or through the cul-de-sac from below. Irritation of the small bowel with a drain stimulates adhesions which may immediately or at some later date result in mechanical bowel obstruction.

It is well to bring the drain or drains out through a stab wound. This permits the incision to heal more securely and with less infection.

All drains used must be accounted for so they will not be lost in the depths of the wound and cause much trouble for both the patient and surgeon. Each drain should be transfixed with a sterile safety pin at the time of insertion. The pin tends to keep the drain from being drawn into the wound and, should the drain be lost, its presence within the abdomen can immediately be discovered by x-ray. The operative record should state the number and type of drains used, and, at the proper time, the progress notes should state the type and number of drains removed.

The time for removal of a drain depends on its type and purpose and the qualitative character of the infection.[5] These factors must be weighed by the surgeon in every case; however, certain general rules may be followed.

Drains in the abdominal cavity may be removed:

1. When serous drainage or oozing ceases
2. When the acute infection has subsided
3. When there is an adequate fistulous tract to the external fistula
4. When the danger of leakage of a sutured area is past
5. When an abscess has healed from the bottom out, especially an abscess having thick or rigid walls.

In removal of drains from the abdominal wall:

1. Those used for soft tissue drainage or prevention of infection are removed in 1 to 3 days.
2. Those used for evaluation of soft tissue infection are removed when cellulitis is controlled and the resulting exudate has cleared away.

The type of drain used is determined largely by the indication for drainage and the nature of the part to be drained. Some of the general principles are as follows:

1. Fine-meshed gauze covered with rubber dam, dry or impregnated with emollients, is used in contaminated traumatic wounds that cannot be sutured.
2. Rubber dam in small strips is used to drain areas of superficial infection.
3. Penrose tubing and cigarette drains are used in the peritoneal cavity.
4. Rubber tubes are used for draining abscess areas with thick and rigid walls or for draining a hollow viscus such as the gallbladder, urinary bladder, or a portion of the intestinal tract.
5. The sump drain is useful when drainage is copious and potentially destructive as in external duodenal and pancreatic fistula.

Rubber tubes should be used with caution for draining the peritoneal cavity per se inasmuch as pressure of the thicker tubing may erode a blood vessel or viscus. Also, raw gauze is seldom used to drain the abdomen since it tends to become too adherent, thus producing extensive trauma on removal. If used, it may become adherent in the wound and not loosen itself until about the eighth day.

The following are Harvey's[1] indications for draining the peritoneal cavity:

1. The presence of gross amounts of dead tissue associated with micro-organisms
2. Insecure closure of a hollow viscus
3. Uncontrolled bleeding
4. The presence of exposed retroperitoneal tissue plus contamination.

Infection per se is seldom, if ever, an indication for drainage. The intact peritoneum is capable of dealing with great numbers of micro-organisms. Harvey[1] states that contamination in an area small enough to be controlled by a drain is not to be greatly feared. Schullinger[6] states that the presence of two or more organisms in a direct smear of the exudate should be an indication for drainage. Of course, widespread contamination of the peritoneal cavity is potentially dangerous. However, widespread areas cannot, as a rule, be adequately drained. As implied above, drains are beneficial only in very localized areas, owing to the close adherence of serous surfaces to the drain.[2]

We have applied the four indications for drainage as follows:

1. The presence of gross amounts of dead tissue associated with micro-organisms. We do not apply this principle in the presence of the ordinary minute amounts of necrotic tissue resulting from the clamping and tying that occurs in any surgical procedure. We do apply this rule, however, when confronted with a necrotic abscess wall or any situation with gross amounts of dead tissue in the presence of infection or contamination. We do not apply the rule in the case of a perforated appendix that has been easily removed and the peritoneum carefully cleaned of the contents spilled in the abdomen. We do apply it when the perforated appendix has been walled off in an abscess, and the wall has resulted in a necrotic membrane. It is also applied to the necrotic and compromised tissue resulting from severe operative trauma, especially where infection or contamination is present.

2. Insecure closure of a hollow viscus. Whether or not closure of a suture line in repairing a hollow viscus is considered secure depends in some degree on

the experience and judgment of the surgeon. However, if the walls of the hollow viscus are inflamed or swollen, the suture line under tension, or the blood supply to the sutured area impaired, a drain becomes a safety valve protecting the patient from possible catastrophe. In some cases where resection is necessary in the presence of peritonitis or when the cecum is too edematous for the closed appendiceal stump to be secure, a drain should be used.

3. Uncontrollable bleeding. Occasionally the surgeon may have to deal with a raw surface with capillary bleeding that is difficult to control. There may be a small bleeding area that he chooses to leave because of difficulty of securing sutures, or because of the need for haste. Denuded areas with capillary bleeding resulting from dissected inflammatory lesions, the appendix, or tumors of the abdomen and pelvis should be drained. When bleeding is controlled and the raw surfaces covered with peritoneum, drainage is not necessary.

4. The presence of exposed retroperitoneal tissue plus contamination. In this case, the peritoneum, which is the first line of defense of the abdominal cavity against infection, is gone, and micro-organisms have free entrance into less resistant retroperitoneal tissues.

These four reasons for draining the abdomen are quite specific and properly guide the thinking of the resident surgeon. Interpretation of the condition at hand still requires clear thinking and good judgment. However, if the thoughtful, conscientious surgeon will master the principles of abdominal drainage, he will be able to act without fear or misgiving. He will not be misguided by catch phrases, such as "When in doubt, drain," or "When in doubt, don't drain." We feel that following definite proved principles in the use of drains contributes in no small measure to the lessening of complications and mortality in abdominal surgery.

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Peptic Ulcer

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The controversy over and the magnitude of any medical problem seem to be in direct proportion to the number of articles written about it. Certainly considerable controversy has existed in the past two decades on the subject of peptic ulcer and today there is even more awareness of the magnitude of the problem.

As surgeons it is important that we crystallize our thinking in regard to accurate diagnosis and management of this lesion. Two decades ago, many internists were convinced that the treatment of peptic ulcer was strictly medical, except in the presence of perforation or obstruction. In the early part of the last decade, there was a tendency for the surgeon to become overenthusiastic in regard to surgical treatment. Today we are all aware that the management of the ulcer should be through the combined efforts of the internist and the surgeon, who agree upon the basic treatment of most ulcers. The obstructing ulcer is definitely a surgical problem; the chronic duodenal ulcer, also referred to as a chronic intractable ulcer, which fails to respond to medical management, often becomes one; and the perforated ulcer is usually one. The surgical staff at Doctors Hospital has had some painful experiences in helping to resolve these problems in the past.

I would like to discuss the penetrating, the bleeding, and the gastric ulcer on the basis of our experience. Some confusion still exists as to the management of these lesions. The surgeon is called upon many times, not only to perform the operation, but to express his opinion regarding diagnosis and whether or not surgical intervention is necessary or wise.

PENETRATING ULCER

The penetrating ulcer presents difficulties in diagnosis and also in the technicalities involved in surgical therapy. Penetrating ulcer is the type which erodes through the layers of the stomach and is sealed off by an outside organ, setting up secondary inflammation. The pancreas is most commonly involved from a posterior penetrating ulcer. The anterior ulcer generally results in acute perforation, rather than in a penetrating type of lesion. The penetrating ulcer is intriguing because diagnosis is not a matter of x-ray and laboratory tests. This does not imply, however, that these procedures should not be utilized. A careful history and physical examination, both of which seem to be lost arts, are the key to diagnosis.

Patients with penetrating ulcers, frequently otherwise healthy males, are often mistaken for psychoneurotics and hypochondriacs and go from doctor to doctor, searching for relief. They do not give a typical ulcer history, and this can be misleading and confusing if care is not taken in eliciting the history. Many times it is possible to go back a few months or several years and get a definite ulcer history with a food-comfort-pain syndrome. Generally the early history will show that the patient may have been treated several times for ulcer and assured that it had healed.

The pain is different from that of other ulcers in that it is constantly present and is not greatly relieved by aluminum hydroxide or other antacids. The patient usually complains of a penetrating type of pain which goes directly through the abdomen into the back. It is characteristic of pain associated with the pancreas. The patient may have an agonized expression which seems to express his plight. Medical treatment is most unsatisfactory.

Posterior ulcers are quite difficult to demonstrate on x-ray. It is helpful, however, if the x-ray department can be advised of the possibility of penetrating

ulcer so special care can be taken in searching for it by fluoroscopy and technics can be used which will help to demonstrate an ulcer in this position. Gastric analysis is certainly helpful in supporting the clinical diagnosis. We have learned that by study an accurate clinical diagnosis can be reached in these cases, so that there is no hesitation in recommending exploration of the upper abdomen. It is difficult to state how many attacks the patient should suffer before being operated on; however, these cases certainly demonstrate that the patient should not be left to have ten, fifteen, or twenty attacks of severe ulcer pain under medical treatment. It is not good management to allow the entire area of the duodenum and pancreas to become densely scarred and tremendously increase the hazards of surgery before this type of treatment is offered. It is our experience that penetrating ulcers do not respond to any treatment other than surgery.

BLEEDING ULCER

The hemorrhaging ulcer is of special interest to the surgeon because the decision to operate, and when, rests with him. A methodical approach should be taken in consultation. A careful history and meticulous physical examination are of primary importance. Certainly a history of previous ulcer or of previous hemorrhage with vomiting of blood is very helpful in reaching a decision. The immediate clinical evaluation of pulse rate, blood pressure, and general condition of the patient is of utmost importance in determining the immediate treatment and also in evaluating the progress of the case. These lesions cannot be handled adequately by administration of 1 or 2 pints of blood; a considerable amount must be available, and all concerned must be alert to the need for it.

The site of hemorrhage must be located. Many patients will have profuse rectal hemorrhage, which may lead to the belief that bleeding is from the lower tract. We have found it helpful to pass a Miller-Abbott tube to locate the site of hemorrhage. If blood is encountered in the stomach, the tube is removed and not passed further. When it is demonstrated that bleeding is from the upper intestinal tract, x-rays are taken as soon as the condition of the patient permits. Many times x-ray is of little value since a blood clot may be present in the ulcer, making it difficult to visualize the ulcer crater. The ulcer bed may be very shallow, and I am sure all surgeons have seen bleeding ulcers which involve only the mucosa. Esophageal varicosities with secondary hemorrhage must be kept in mind. We feel that these patients should be not completely exsanguinated before being considered for surgery. The following are considered to be indications for surgery:

1. Continued evidence of massive hemorrhage in spite of conservative measures
2. Recurrent massive hemorrhage after a quiescent interval of hours or days
3. Evidence of continuous oozing from an ulcer which makes it difficult to maintain normal blood levels by transfusion.

In general, the decision concerning surgery should be made within 72 hours after admission of the patient. Any further delay should be considered dangerous procrastination. The poorest surgical risk is the patient who has been bleeding for days or weeks and who has had his blood replaced time and again. It is remarkable what excellent condition some of these poor-risk patients achieve after controlling bleeding at surgery and replacing blood as soon as this bleeding is controlled.

Surgery should be delayed if the following conditions are present:

1. Bleeding of doubtful origin
2. If it is established that the bleeding is from esophageal varicosities
3. Prompt cessation of hemorrhage under conservative management
4. Presence of other serious diseases, including hemophilia or blood dyscrasias, which contraindicate surgery.

GASTRIC ULCER

The gastric ulcer is of special interest because of its potentiality for malignancy. We believe that this is the ulcer which all too often is handled conservatively too long. One dare not procrastinate and allow malignant change to take place. Lahey and Marshall[1] concede the error in diagnosis to be somewhere between 10 and 20 per cent. When malignancy becomes obvious, the chance for successful management has all too often passed.

There has been wide variation of opinion regarding the management of gastric ulcer. I believe for the most part there is now agreement that ideally any patient with gastric ulcer should be hospitalized, and healing should take place under institutional care and observation. All ulcers of the greater curvature of the stomach should be considered malignant and have immediate surgery. Other ulcers may be observed for 3 weeks. If healing does not begin in that time, surgery should be carried out. If healing has started, the patient should be observed for 3 more weeks. If healing is complete, the lesion can then be considered benign and further conservative treatment and observation are continued. If the lesion is not healed at the end of 6 weeks, then certainly surgery should be considered. Of course, gastric analysis is of value in advanced cases; however, in early carcinoma, gastric secretions may not be greatly affected.

X-ray has provided the greatest help in the management of gastric ulcer, and the gastroscope has great potential when an adequate biopsy specimen can be taken and when all areas of the stomach can be visualized, but we doubt that gastroscopy aids very much in the management and diagnosis of gastric ulcer; the aid given is certainly in direct proportion to the ability and experience of the gastroscopist.

I am sure that doctors would hesitate to handle gastric ulcers as lightly as they do if they realized the percentage of malignancy which prevails in this lesion.

SURGICAL TREATMENT OF PEPTIC ULCER

Some basic conclusions regarding the actual surgical technic of handling peptic ulcer have been reached. In our experience, a left rectus incision in the asthenic type of individual is ideal, and a transverse incision in the sthenic type is our choice. Both give excellent strong incisions. Adequate exposure is certainly of primary importance in any surgery; and the procedure should be carried out in a reasonable length of time, but, needless to say, technic should not be sacrificed for time. Speed is more important in the management of the bleeding ulcer than in other types. Gastrostomy, in order to visualize the bleeding point and empty the stomach of blood to prevent regurgitation, is a worth-while procedure and is done in spite of endotracheal anesthesia. Early ligation of the bleeding point by clamping the chief blood supply in this area is also valuable. In the penetrating type, the ulcer

can be freed from the pancreas in most cases by meticulous dissection. Many times it is advisable to go distal to the ulcer and carry the dissection proximally. We remove the ulcer completely whenever possible; however, one must remember the duct of Santorini can lie very near to the duodenum and may enter it abnormally high. If this duct is severed, it must be ligated with black silk.

Care must be taken in a two-layer type of closure of the duodenal stump. The sutures are not carried directly into the pancreas if it can be avoided because of the secondary complication of pancreatitis. All suturing of the pancreas must be done with nonabsorbable sutures. We are also careful to avoid direct trauma to the pancreas, for we believe that trauma helps to incite pancreatitis.

We have utilized the anterior Polya procedure with the Hofmeister modification in the majority of subtotal gastrectomies we have performed. We have, however, found that the Billroth I technic is faster and will get excellent results with certain types of gastric ulcer. The peritoneal reflection may be incised laterally to the duodenum, thus greatly increasing the mobility of the duodenum. Regardless of whether a Hofmeister or Billroth I technic is used, we firmly believe that 70 to 75 per cent of the stomach should be resected, and, if the patient has a high acid content prior to surgery, close to 80 per cent should be resected.

We have combined vagotomy with gastric resection and have noted no marked difference in postoperative recovery or symptoms. It adds some time to surgery and probably does not add a great deal to the end result if the proper amount of stomach has been resected. We have reserved vagotomy chiefly for cases of recurring ulcers of the stomach; however, we believe recurrence can be kept at a minimum with adequate gastric resection.

We anastomose the jejunum to the stomach in the Hofmeister technic so that the ligament of Treitz is approximately 6 to 8 cm. from the anastomosis, and the efferent loop of the jejunum is allowed to be at the greater curvature. The use of the von Petz clamp has greatly obviated technical difficulties. The incision of the gastrohepatic ligament with adequate visualization of the left gastric artery helps to simplify gastric resection. The operation is planned to remove all of the lesser curvature of the stomach up to approximately 2 cm. above the point where the left gastric artery is ligated. This acts as a very valuable landmark in setting the clamp at the lesser curvature.

If there is any suspicion at the time of surgery that the gastric ulcer is malignant, frozen sections are examined. If the ulcer has become malignant, certainly a very extensive subtotal gastrectomy should be performed. We have performed total gastric resection on six patients, four of whom were living at the end of 5 years. This would argue in favor of total gastrectomy in the presence of gastric ulcer.

One of the most marked improvements demonstrated in the management of our peptic ulcer patients has been in postoperative electrolyte balance. All patients who have had gastric resection have a Levin tube installed for the first 48 hours. As soon as adequate output is established, the patient is given potassium chloride intravenously with fluids and the sodium and potassium are carefully managed during the first 72 hours until the patient has an adequate oral intake. Determination of carbon dioxide combining power, as well as of potassium, sodium, and chloride levels, is very helpful in this phase of management. Solutions developed by Baxter Laboratories have done a great deal to simplify the management of postoperative electrolyte balance. Solution No. 1 is used when the Levin tube is in place. Solution No. 2 is used for the maintenance of the patient while he is not eating, but before drainage has been instituted. Solution No. 3 is used for mild alkalosis. Prior to the availability of these solutions, ammonium chloride and postassium chloride solutions were used.

Every attempt is made to have the patient ambulate within 24 hours after surgery, and we are convinced that early ambulation lessens postoperative complications. Rib raising, deep breathing, and turning of the patient the evening of surgery are excellent for the patient, and it is our observation that osteopathic manipulative treatment to the dorsal area lessens postoperative complications.

The importance of the anesthetist must not be overlooked. The use of endotracheal anesthesia has practically eliminated immediate surgical mortality. Without further elaboration, it is obvious that tremendous strides have been made in the last few years in this field, that the number of tragic experiences occurring in the operating room and immediately after leaving it has been reduced tremendously, and that much of the credit is due to the anesthetist.

SUMMARY

1. A peptic ulcer should be managed by the combined efforts of the internist and surgeon.

2. There should be early surgical consultation in all ulcer cases.

3. The penetrating, the hemorrhagic, and the potentially malignant gastric ulcer remain the chief problems of management.

4. Adequate history and physical examination are of prime importance in diagnosis and management.

5. Proper exposure, correct choice of procedure, and perfected technic will greatly lower mortality and morbidity.

6. Postoperative electrolyte management, early ambulation, and continued improvements in anesthesia will help to prevent postoperative complications.

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Gastroscopy
Its Practical Application

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Methods of visualization of the interior of body organs and cavities have become increasingly popular in recent years as instruments and technics have been perfected. Theoretically, the gastroscope has been available as a diagnostic aid for many years, but became generally useful only with the introduction of the Schindler flexible gastroscope some 15 years ago. This instrument makes the procedure relatively simple in trained hands and has eliminated the rather large element of risk inherent in the use of nonflexible instruments. On the other hand, complications and even fatalities are still being reported with the Schindler gastroscope, though practically all of them have occurred when the instrument was being used by physicians whose experience with it was limited.

There has been considerable literature in the past few years illustrating that gastroscopic visualization of the stomach has often been able to establish a diagnosis when x-ray has failed. Our experiences at the Chicago Osteopathic Hospital would indicate that competition between the radiologist and the endoscopist is unnecessary. The ideal procedure is a cooperative investigation made by the radiologist and endoscopist together; when the latter is a clinician and not a technician a really effective diagnostic program becomes available. Most roentgenologists find gastroscopic visualization makes their understanding of radiologically demonstrated lesions more complete, particularly in those cases where surgery cannot be utilized. On the other hand, any gastroscopist of experience would insist upon a complete roentgenologic visualization of the upper gastrointestinal tract before performing a gastroscopic examination. There are many indications for gastroscopic visualization that might be listed, but in my experience the following five are the most common.

One of the most frequent indications is for the patient who has upper abdominal symptoms which cannot be explained by any other findings, including x-ray. Gastroscopic visualization may confirm the normality of the stomach reported by x-ray, or it may reveal a lesion that has been missed by x-ray examination. Most frequently the lesions which are found will be of some type of chronic gastritis which I will discuss later.

Gastroscopy is also indicated in the patient in whom x-ray findings are rather indefinite, and when it is difficult to be sure that the lesion is not just spasm or other deformity of a physiologic nature. This problem is most often encountered in the antral portion of the stomach where spasm produces deformity suggesting the presence of a gastric ulcer, polyp, or even an infiltrative lesion.

A third indication is in upper gastrointestinal hemorrhage when a cause has not been demonstrated. Frequently this is found to be due to chronic gastritis, particularly hypertrophic gastritis, or an acute peptic ulcer that is so shallow that it causes very little deformity of the mucosa when seen by x-ray. A negative examination here is of course also very helpful.

The fourth use of the gastroscope in my experience is in following the progress of gastric lesions. Unless one adopts the policy of operating on every gastric lesion, he is forced to face the rather heavy responsibility of deciding whether or not the lesion is malignant. Direct visualization of the healing process can be a much more reassuring procedure than dependence upon the change in the x-ray silhouette.

The last indication is in the patient without stomach disease but with a definite conviction that he does have it. In my opinion, there is no better way to convince such a patient that his stomach is normal than to perform gastroscopy and follow it with reassurance that all is well.

The indications for the procedure cannot be discussed without giving some attention to the contraindications. Four of the more important contraindications are recent myocardial infarction, marked restriction of extension of the cervical spine, which makes it difficult to pass the instrument, esophageal obstruction, or any other disease of the esophagus which would either hinder the passage of the instrument or would be aggravated by the slight trauma of instrumentation, and the absence of an x-ray study. I have on various occasions made complete examinations of patients in the presence of these contraindications; however, I would not advocate doing this unless it was clearly justified by the circumstances.

The gastroscopic procedure itself is as follows:

The first step is the review of the patient's x-rays and his general clinical condition. Any defects observed on x-ray of course will deserve more careful scrutiny. The findings can be better interpreted in light of the general clinical condition. The patient should not have eaten for at least 6 hours in order to be certain that the stomach is empty. In some cases where pyloric obstruction is present or if the examination must be made soon after a meal, it is possible to prepare the patient by gastric lavage with normal saline and make a reasonably good examination. Nembutal is the usual sedative, and it is given 2 hours before the examination.

After experimenting with a number of different preparations for premedication, Demerol and atropine have proved to be as effective as anything I have tried. Demerol has a less incapacitating effect than some of the other premedications, and, therefore, is administered to outpatients before examination. Locally 2 per cent Pontocaine with a small amount of aqueous epinephrine is used to diminish the gag reflex.

The next step is aspiration of the stomach, thus facilitating examination by clearing away much of the gastric secretions and mucus which may be present. This also assures the patency of the esophagus and provides material for testing the acidity of the gastric secretion. The gastroscope is passed with the patient in the left lateral decubitus position, and the examination is usually completed with the patient in that position. However, occasionally, in order to visualize certain areas of the stomach more completely, it is necessary to turn the patient on his back, as in a bronchoscopic examination, or to the right lateral decubitus position.

Table I contains a summary of the findings in 418 gastroscopic examinations which were made at the Chicago Osteopathic Hospital. Gastric visualization was

particularly helpful in the 169 patients found to have normal mucosae, because frequently this was reported in the presence of some abnormality of a questionable nature noted at fluoroscopy or on the x-ray films. The 146 cases of chronic gastritis include those in which symptoms or findings, such as abdominal pain or gastrointestinal bleeding, were unexplainable by any other means. In many of the 81 cases of gastric ulcer, both benign and malignant, the value of cooperative effort between the roentgenologist and the gastroscopist was particularly demonstrated. The remaining examinations were not particularly significant, but I am sure a more complete understanding of the patient's problem was obtained by combining the procedures of x-ray and gastroscopy with clinical judgment.

Table I—Summary of Gastroscopic Findings at Chicago Osteopathic Hospital

Normal mucosa		169
Gastritis, acute		3
Gastritis, chronic		146
Superficial	24	
Atrophic	46	
Hypertrophic	76	
Gastric ulcer		81
Benign	60	
Malignant	21	
Annular carcinoma		2
Leiomyoma		1
Polyps		13
Benign	10	
Malignant	3	
Giant rugae		3
Total Examinations		418

In order that you may have some idea of what gastroscopic visualization is like, I will discuss a few representative findings in some of the lesions in this series.

The clinical diagnosis of chronic superficial gastritis, like that of any other type of chronic gastritis, can be established only by gastroscopic examination. This disease shows no gross or histopathologic similarity to chronic atrophic gastritis, but it has been well established as a precursor of the latter. The chief gastroscopic signs of this condition are patchy hyperemia and purulent exudate. Often present, but not necessary for diagnosis, are hemorrhages and erosions. As a matter of fact, whenever hemorrhages and erosions are abundant the disease is likely to be chronic superficial gastritis. Superficial gastritis responds better to treatment than do other types of chronic gastritis and sometimes heals entirely without any gastroscopically observable sequelae. Quite frequently, however, one can see superficial gastritis progress to atrophic gastritis.

Chronic atrophic gastritis occurs as an apparently isolated disease process and also as an important manifestation of more generalized diseases, such as pernicious anemia, vitamin deficiencies, and hypothyroidism. Although it is sometimes said that atrophic gastritis is one aspect of the aging process, the majority of patients in the seventh and eighth decade show no such gastritic change. The condition, therefore, must be considered a disease whenever found.

The gastroscopic signs are mainly those resulting from loss of the gastric chief cells. These cells apparently are responsible for the opacity of the gastric mucosa. The mucosa takes on a peculiar color which is best described as pale slate-red, although it may vary to all shades of gray. The blue venous channels of the submucosa are always visible, and they make up a prominent part of the endoscopic picture. This gastritis is quite important from the standpoint of preventive medicine in that it is considered a precancerous lesion. Often atrophic changes are reported several years before the appearance of hematologic changes of pernicious anemia, and, for that reason, the diagnosis is considered an indication for life-long treatment with liver extract, just as in pernicious anemia.

Chronic hypertrophic gastritis is one of the most common diseases of the stomach. Except in the latest stages, the disease process does not significantly alter the mucosa relief observed on radiologic examination, and the diagnosis can be established only by gastroscopy and by histologic study. The most characteristic gastroscopic finding in this disease is the loss of the mucosa's normal translucency which gives it a lifeless dull appearance. Sometimes there is an impression of stiffening in a part of the mucosa which gives the appearance of mucosal infiltration, in which case malignant processes must be ruled out. In the majority of cases there is pebbling of the mucosal surface, and these pebbles are more prominent between the rugae than over them. Erosions and excess mucus are frequently found in stomachs with chronic hypertrophic gastritis, particularly over the diseased areas. Many cases of upper gastrointestinal hemorrhage of undetermined origin can be proved to result from this type of gastritis or, perhaps, from superficial gastritis.

Gastroscopy is useful in the diagnosis of polyps. There are three types of polyps; first is the inflammatory pseudopolyp which originates as a compensatory formation in the presence of chronic atrophic gastritis. The second type is the true adenomatous polyp. The third, which is seen less frequently, is the hyperplastic polyp. All of these are considered premalignant, and, of course, should be removed if found. The size of the polyp bears no direct relationship to the degree of its malignant tendencies. The small ones may frequently be missed on routine x-ray examination but should be evident with the gastroscope.

Gastroscopy often proves valuable in cases of gastric ulcer. In active acute ulcer, although there is considerable peripheral reaction with edema and hyperemia, the important gastroscopic feature is that the nature of the crater's edges can be determined, and they are seen to be sharply defined and regular and clean. Irregular edges and bleeding are signs of malignancy.

In active chronic ulcer the sharp squared-off condition of the crater's edges indicate a benign type of lesion. The absence of the peripheral reaction indicates chronicity.

Even though features are found indicating that an ulcer is benign, I would hesitate to make a definite diagnosis on the basis of a single examination. Demonstration of a definite healing process at a repeat examination in 10 days to 2 weeks would be necessary for such a diagnosis, and even then I would like to perform a third examination to prove complete healing of the lesion before I would feel that I could give an absolute diagnosis of benign ulcer.

SUMMARY

This has been a review of the indications, contraindications, and the procedure of gastroscopy and a summary of 418 gastroscopic examinations performed at the Chicago Osteopathic Hospital. From this ex-

perience it seems that gastroscopy is helpful in cases of unexplained upper abdominal pain or gastrointestinal bleeding of undetermined origin. In the presence of these conditions the diagnosis of chronic gastritis can hardly be made without a gastroscopic examination. Gastroscopy has also proved useful when there are questionable x-ray findings or when it is necessary to follow the progress of gastric lesions under nonsurgical management. Although gastroscopic visualization of the gastric mucosa is a valuable diagnostic procedure, it, like any other means of diagnosis, will be found to be more valuable if interpreted in the light of x-ray findings, other clinical findings, and the physician's clinical judgment.

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The General Surgeon and Operative Obstetrics

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INTRODUCTION

A subject such as this may seem a misnomer or at least inappropriate for such a meeting as ours, and yet, if history is reviewed and the true situation surveyed, it will be seen that such is not the case. It is a subject that should be considered by all of us, and certainly one that should be especially surveyed by many who are really integrated into some type of obstetric work.

Obstetrics as a specialty is new. In fact, as recently as the beginning of this century there was little real recognition of this field as a specialty practice.

MATERNAL MORTALITY AND MORBIDITY

For ages, babies were delivered, in the main, by midwives or even by friends who presumably had some little experience. The serious results of such practices led to careful consideration by physicians who were interested in the welfare of the race. For a long, long time, a physician was called for a delivery only when serious trouble ensued, perhaps the death of the baby or the impending death of the mother, or a very long difficult ineffectual labor where real help was needed.

There was a multiple array of contributions, such as they were, offered to the expectant mother, in the hope of aiding her in delivery. These included potions, postural conditions, artificial aids for extractions, drugs and herbs of all sorts, and incantations that were supposed to be of great aid in solving the mystery of difficult childbirth.

Fortunately, a few far-sighted, conscientious, clear-thinking physicians gave ardent consideration to the basic principles of labor, but deaths caused by pregnancy and labor continued to be appalling. Morbidity and subsequent complications reached even greater proportions. It would be impossible to give accurate statistics; in fact, they are not necessary. It is sufficient to say that, even with modern practice, about 5,000 women in the United States lose their lives every year in connection with childbirth.[1] At least a like number are maimed so that their lives are seriously impaired.

The three great causes for these deaths have been hemorrhage, toxemia, and infection. A vast amount of research has been done to understand and solve some of the problems evident in all of these fields.

Deaths from hemorrhage have been greatly reduced, and since deaths resulting from placenta previa and abruptio placentae at one time comprised a great proportion of the deaths from hemorrhage, the surgeon has figured in a majority of such cases.

The complex subject of toxemia is still being studied; more is understood about it, but there is still much to learn. It is known that proper antepartum care will do much to reduce the dangers of toxemia. While eclampsia still exists, the percentage of deaths due to it has been greatly reduced, but its effects very frequently injure the individual from a renal standpoint, or otherwise, for the rest of her life.

The greatest advancement has been made in the field of infection. Antibiotics and associated medications have made possible tremendous advancement, and septicemia is no longer the threat it was only a few years ago.

THE GENERAL SURGEON AS CONSULTANT

This discussion, however, is concerned with the relationship of the surgeon to operative obstetrics. In a few small areas, particularly in large cities where the obstetric specialist is more commonly found, the surgeon probably plays little part in the care of the expectant mother. These districts are decidedly limited. It is generally accepted that the surgeon knows and understands all phases of operative work relating to the human body. He may limit himself to a particular area but, I am sure everyone will agree that the good surgeon, regardless of his specialty, has more than a meager understanding of the over-all surgical picture.

It is only logical then that the obstetrician or general practitioner, limited in his surgical experience and perhaps in his desire for such work, when confronted with what is an operative problem in obstetrics, looks to the surgeon for aid and assistance. This has been true for many years. It probably will continue to be so both in the smaller town where the general practitioner is located and the large city where the specialist in obstetrics is not found.

It behooves us then, as a surgical college, not only to look at this subject honestly and squarely, but actually to appreciate the true condition and the ramifications with which we are confronted. It is obviously impossible to discuss all of these problems; however, some of the most outstanding examples should be mentioned and special consideration should be given them. Such a discussion is consequently more suggestive than conclusive.

Even in the large cities, particularly in the general or county hospitals, there is a fine line of division between what might be considered general, gynecologic, and obstetric surgery. Not infrequently, the general surgeon opens an abdomen believing that he is dealing with some general surgical problem, even a case of appendicitis, which may prove to be an ectopic pregnancy; certainly the converse is also true. Regardless of specialization or division of the body for surgical purposes, the fact remains that the individual is a unit divided into component parts—systems, organs, cells,

et cetera. There is a definite relationship which cannot be ignored and which every surgeon must appreciate and understand.

There are other very definite reasons why such considerations are necessary; for instance, all well-regulated and recognized hospitals require consultation in certain problems; in a great majority, the surgeon is chosen as a consultant. Consultation is required primarily for the best interests of the patient; but, in addition, the possibility that medicolegal problems may arise should not be overlooked.

Since every hospital deals with a certain number of patients with threatened, inevitable, or incomplete abortion and those unfortunate patients in whom an infection is present following criminal abortion, the surgeon should review these classifications and familiarize himself with them so that when he is called into consultation, he will be able to recognize the type of abortion which exists. The signs, symptoms, and indications for treatment are fairly clear. It is only a matter of understanding, examining, and then concluding into which classification the particular case falls. If the surgeon is to maintain the respect, admiration, and position which he has held for years, it behooves him to consider these problems seriously.

General practitioners have, for a number of years, been disturbed about their position in the average hospital and, whether the feeling is justified or not, have believed that the surgeon has produced for them a condition of insecurity and uncertainty. As a result of this belief, they have organized groups which have given serious thought and study to such problems as are mentioned here.

This is likewise true of the great group of obstetricians who really appreciate and understand the serious responsibility that rests upon them. They do not rely upon the general surgeon for advice and suggestions, but rather, they call him in for consultation and then perhaps utilize the information he has given them but do not necessarily follow it to the letter.

An illustration will best explain my point: Assume that you, as a general surgeon, are called into consultation with the general practitioner or obstetrician in your locale and are faced with the problem of an operative delivery. Just because you are a general surgeon does not mean that the patient should necessarily be delivered by the abdominal route. It is your responsibility to judge from examination and findings what type of operative delivery will give the best results for both the mother and child. You should ask yourself, "Can this baby be delivered to the best advantage by the abdominal or by the vaginal route?" If the vaginal route is chosen, "Should it be a forceps delivery or podalic version and extraction?" By being even more fundamental in your reasoning and thought you might ask these questions: "Honestly, why should I desire to interfere with natural delivery? Why must the child be extracted?" This is the broad consideration, in the true word.

THE FACTORS IN LABOR

It would be well, therefore, to review the factors that are involved. In teaching, we term the factors "the four P's": (1) powers, (2) passenger, (3) passages, (4) pathology.

With such an outline in mind, it is not difficult to review quickly the factors that are involved under all of these headings. It is assumed that the reason the surgeon's assistance is requested is that the mother is unable to deliver without help.

FORCEPS DELIVERY

First I shall consider the question of forceps delivery. Certain definite conditions which must be present for such a delivery should immediately come to mind:

1. The cervix must be fully dilated or easily dilatable.
2. The membranes must be ruptured.
3. The presentation must be favorable, and the head must be engaged.
4. There must be no disproportion between the fetal head and the parturient canal.
5. The baby must be alive.

The obstetric forceps is an instrument used to extract a live fetus through the normal birth canal without injury to the child or mother. Such instruments as Kielland's forceps and forceps used in cesarean section are not obstetric forceps in the true sense. They are instruments devised to perform a particular function in an operative delivery other than extraction. When it is decided that all the conditions are present, it then must be determined that there is a proper indication. The indications are delayed labor and dangerous labors as outlined below:

Delay in Labor.—

1. Uterine inertia. This is the greatest indication for forceps delivery.
2. Faults in the passage. Resistance may be abnormally great, particularly in the pelvic floor, vagina, and vulva, but it is believed that abdominal delivery is not indicated. Also, there may be resistance from a moderately contracted bony pelvis that can be overcome with the use of forceps without injury to the child.
3. Faults in the passenger. These include occiput posterior or occiput transverse positions in which the head may be slightly larger than normal but not a contraindication to instrumental delivery. In addition, this category includes the after-coming head in breech deliveries.

Dangerous Labors.—

1. Maternal heart disease that will not withstand a long difficult second stage, moderate hemorrhage, threatening eclampsia, asphyxia of the child, prolapsed cord, and like problems are included in this group. It should never be forgotten that there are dangers in using forceps; pressure injuries, tentorial tears, and even serious paralysis all too frequently result from improperly applied forceps or the use of forceps in the presence of contraindications. There seems to be, generally, too little hesitation on the part of hospitals to permit incompetent people to use forceps when, under the same regulations, opening the abdomen is regarded as serious. The fact that the mortality following simple appendectomies is much lower than the mortality in the use of forceps is disregarded. With the possible exception of simple outlet forceps, a review of the literature and statistics would indicate that there is entirely too large a percentage of trauma and even irreparable injuries to the mother from the use of forceps. Many are due to lack of proper preparation for such a delivery; for instance, if the simple procedure of catheterization is overlooked, a bladder injury might result, which will require a long, tedious, and difficult operative procedure to repair.

PODALIC VERSION AND EXTRACTION

There has been a tendency in this country to condemn podalic version and extraction delivery. It is my opinion that such a condemnation is without justifica-

tion. The important thing is to be sure that the proper indications and conditions are present, and that the operator is familiar with the technic of such deliveries.

Potter[2] has perhaps made the greatest contribution of anyone in this country toward giving this type of delivery proper consideration. I would not be so bold as to endorse his program in its entirety. He says that he delivers about 75 per cent of his cases by podalic version and extraction, 20 per cent by section, and the remainder by forceps.[3] His vast experience and his intense study of the subject have placed him in a position to know the advantages and the pitfalls in this procedure.

The following conditions must be present before this operation is performed:

1. The cervix must be dilated or dilatable.
2. There must be no disproportion.
3. The membranes must be intact or only recently ruptured.
4. The uterus must not be too firmly contracted down on the fetus.

The indications for internal podalic versions are:

1. Fetal dystocia: faulty attitude, presentation, or position
2. Placenta previa marginalis
3. Prolapsed cord
4. Prolapse of one or both arms
5. Accidental hemorrhage
6. Threatened death from eclampsia or other complications.

It is readily seen that the indications here are quite different from those for the use of forceps.

The preparation for either forceps or version is of vital concern. Emptying of the bladder and rectum, aseptic preparation of the patient, positioning on the table, and the proper use of anesthetic are important measures, but space does not permit elaboration.

CESAREAN SECTION

Even though there are few general surgeons who have not performed cesarean section, every general surgeon might well ask himself, "How familiar am I with the factors and considerations involved, the different types of operative procedures, and the sequelae that could and, many times, do follow such a delivery?"

Let me say, here and now, I am not defending any percentage of cesarean sections in any hospital. An expectant mother goes to the hospital with one thought in mind—to carry home a live, healthy baby in her arms. The physician's concern should be: "Have I performed the proper type of delivery, whether it is cesarean or otherwise? Have I done it in an acceptable conscientious manner?" Naturally, statistics cannot be ignored, but if such statistics are made to the detriment of the human race, they rightfully should be changed.

If other operative procedures are causing an unnecessary number of obvious birth injuries or birth injuries later manifested by individuals with low IQ's, nutritional problems, or secondary sequelae, then it is time for all surgeons, obstetricians and physicians to insist on performing whatever type of delivery is best for the individual.

Prior to the introduction of the Porro operation in 1876, maternal mortality in cesarean section was more than 50 per cent.[4] Modern surgical procedures and improvement of technic, asepsis, sutures, anesthetics, and all factors involved in operative birth have reduced this mortality to about 2 per cent in all American hospitals and 1 per cent in major obstetric hospitals.[4] This certainly compares favorably with the mortality rate in any type of laparotomy.

By abdominal cesarean section is meant delivery of the child through an incision in the abdominal wall and uterus. The five most common types of cesarean section are:

1. Classical cesarean (Sänger operation)
2. Low cervical or transperitoneal, sometimes called laparotrachelotomy
3. Extraperitoneal cesarean (Latzko and Waters operation)
4. Cesarean section with hysterectomy (Porro operation)
5. Postmortem cesarean.

The type of operation will be governed by the judgment of the surgeon and his judgment will be reflected by the results obtained. The evolution of the various operations and the simplicity, particularly of the classical procedure, has resulted in performing the operation for questionable indications. The following are considered legitimate indication for a section:

1. Cephalopelvic disproportion, contracted pelvis. This is the major indication for section.
2. Pelvic tumor. These are rather rare at the time of labor. However, a large ovarian cyst or fibroid tumor may block the birth canal to such an extent that it would be impossible to deliver the baby through the normal passage.
3. Abnormal presentation. Most of these cases can be handled by other operative procedures, and yet there are cases in which a section is entirely justified with such an indication.
4. Placenta previa. Central placenta previa is unquestionably an absolute indication, but, in my opinion, the majority of cases of marginal and lateral placenta previa can be handled adequately in another manner.
5. Accidental hemorrhage. This may be a sign that the placenta may prematurely separate.
6. Grave systemic diseases. These deserve serious consideration and, in most cases, an internist should be consulted for evaluation of the condition and how the patient will react to laparotomy. In most of these cases, some other type of delivery is usually satisfactory.
7. Fulminating toxemia. Years ago sections were done on eclamptic and even pre-eclamptic patients without much regard for preparatory treatment. Now, it is known that it is much better to treat these patients conservatively, and, in a great majority, they respond adequately to such care and other methods of delivery can be used. There are some cases, however, in which toxemia persists in spite of such care, and section is then justified.
8. Previous section. The incidence of rupture of the uterine scar in a subsequent pregnancy or labor is reported to be 0.28 per cent following cervical cesarean section and from 1 to 4 per cent following the classical section.[1] Repeat section should be considered in any case in which a high classical cesarean section was performed in a previous delivery. Even in cases in which drainage or slow convalescence followed low cervical section, repeat cesarean should be considered. I have delivered a number of women vaginally, or with only slight aid, who have had previous sections. In these women the pelvis was large and the indication, such as placenta previa, which was present in the previous delivery did not exist in the following pregnancy. Normal delivery should be considered in such cases.

9. Elderly primiparas. Fetal distress, particularly in cases in which there is a long rigid cervix and a long ineffectual labor, justify consideration of a section.

Classical Cesarean Section.—

The advantages of the classical operation are:

1. It is the simplest of all cesarean operation technics.

2. It is expedient and can be done more rapidly than other types. For these two important reasons, classical section should be the method of choice whenever the condition of the patient makes speed of operation an important factor.

The disadvantages are:

1. Hemorrhage. There is a greater risk of hemorrhage than in the low transperitoneal section.

2. Postoperative discomfort. Distention and postoperative discomfort are more common.

3. Peritonitis. There is a greater danger of infection in this type of operation.

4. Adhesions. Postoperative adhesions are more common.

5. Rupture of the uterus. There is a greater danger of rupture of the uterus, and since the incision is made in the heavy muscular part of the uterus, the part that involutes, there is more difficulty in healing. Such wounds may be less secure.

Low Cervical Cesarean Section.—

The advantages of the low cervical type are:

1. Less danger of infection. The spill here is not into the abdomen but into the pelvic cavity. Such areas tolerate infection to a greater degree and, even if adhesions or inflammation occurs, they generally respond more readily to treatment.

2. Less danger of peritonitis. The bladder-peritoneal flap is of great assistance if infection should occur. Drainage usually is better, and any possible infection is localized. The operative area is in a more desirable location.

3. Less hemorrhage. The incision is through the less functional part of the uterus where there is more fibrous tissue. Although sinuses may have to be considered, they are dealt with at the time of operation.

4. Better convalescence. The abdominal cavity is not the operative site, and the intestines have not been seen and only a small area of the omentum has been viewed. Less trauma means better convalescence.

5. Less danger of adhesions. Even if adhesions occur, they usually are innocuous.

6. Better scar. The incision is in a passive segment of the uterus. The wound heals better than that in the contractile portion.

7. Being able to operate after a longer period of labor.

The disadvantages are summarized as:

1. A more difficult operation. While such a procedure is not complicated or technically difficult, there is a little more danger in traumatizing the bladder or the ureter. The uterine artery also could be traumatized, and there is, perhaps, a little more danger from embolism.

2. Longer operative time. Although the difference usually is insignificant, the low cervical operation usually requires a few more minutes than the classical.

It is evident, from the above outline, that the low operation should be the operation of choice in most cases.

Extraperitoneal Section.—Extraperitoneal cesarean section is technically much more difficult and has practically been discarded by good operators because the advantages are so few and the disadvantages so many.

The Gottschalk-Portes variation of the extraperitoneal cesarean section in which the uterus is left outside the abdominal wound has been discarded by most good technicians.

Cesarean Section with Hysterectomy.—The Porro operation still has a place in those cases complicated by multiple fibroids, particularly in women who are elderly from the viewpoint of childbearing, and in whom there is more justification for removing the uterus.

CONCLUSION

It is evident from this brief discussion that the general surgeon has an important part in operative obstetrics. He will be wise to consider the viewpoints of the obstetrician and the general practitioner, as well as his own.

This paper has been a plea for cooperation and teamwork between all groups of practice. The patient is the primary consideration: How best can her problem be handled? Although it is commonly said that childbirth is a normal physiologic procedure, this is rarely the case. Trauma may be insignificant, and yet insignificant trauma, particularly to an important part of the anatomy such as the sphincter of the bladder, may result in incontinence and a dismal future. Perhaps the trauma may be greater, and yet unavoidable, but if the general surgeon will obtain the viewpoint of the obstetrician, it will greatly aid the surgeon in handling all of these problems.

It must always be borne in mind that the expectant mother is looking forward to her child and will endure much in its interest. Therefore, the general surgeon should go just a little farther in being more alert to and considerate of all the problems involved, thus making his contribution to operative obstetrics a truly important one.

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Stress Incontinence in the Female

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Stress incontinence in the female has been defined by Ullery[1] as "the loss of urine through the intact urethra under certain conditions which cause an increase in intra-abdominal pressure." This delimits our considerations to disturbances of the anatomy and physiology of micturition above the level of the voluntary urethral sphincter and necessitates a clear understanding of the normal anatomy and physiology of the excretory organs and accessory muscles of micturition.

The female urethra is a tubular structure approximately 3.6 cm. in length, dilatable in the adult to a diameter of 1 cm., with the internal or vesical orifice lying approximately 2 to 3 cm. back of the midportion of the symphysis pubis. Anatomically the urethra lies directly anterior to the lower one third of the vagina, with its distal two-thirds forming an integral part of the vaginal wall.

The supporting structures and accessory muscles of micturition may be divided into three layers or diaphragms penetrated by the urethra. The bulbocavernosus muscles, with fibers of the ischiocavernosus superiorly and posteriorly, lie along the lateral surface of the urethra in the region of the external urinary meatus. These two groups of muscles, from which fibers arise to form the external urethral sphincter, are adherent to the superior surface of the urethra. Laterally the levator ani and pubococcygeus muscles are found with their fascial layers adherent to the external surface of the urethra. The "pubourethral ligaments" are heavy bands of fibrous tissue inserted into the pubic rami, lying along the lateral surface of the urethra and anterior lateral surface of the vaginal wall at the junction of the middle and upper third of the urinary tube. The pelvic diaphragm is composed of connective tissue continuous with the endopelvic fascia and is an integral part of the parametrial fixation of the vesical neck and cervix. The bladder neck is supported by the endopelvic fascia, urethra, anterior or pubovesical ligaments, urachus, ureters, blood vessels, peritoneal reflection, and strong areolar attachments to the rectum, uterus, and vagina.

The dynamics of micturition are further clarified by considering the three groups of muscles comprising the musculature of micturition and their physiologic relationship with the accessory muscles of the perineum and pelvis. These three groups are: (1) the detrusor urinae, (2) the internal sphincter, and (3) the external sphincter. The detrusor urinae is composed of an external longitudinal, a circular midportion, and an incomplete internal longitudinal layer, which, upon contraction, reduce the bladder capacity and empty the bladder. The internal sphincter consists of the circular fibers of the urethra which form bundles and intermingle with the longitudinal fibers to spiral on into the bladder musculature and the muscles of the trigone. The external sphincter is formed from decussating fibers of the bulbocavernosus, ischiocavernosus, and transversus perinei profundus muscles with the added compressing sphincteric effect of the supporting fascia of the pubococcygeus.

Micturition is initiated through cerebral control by way of cord reflexes through the parasympathetic nervous system. This produces contractions of the vesical and urethral musculature and an increase in intra-abdominal pressure, resulting in reduction of the bladder capacity with a corresponding increase in intravesical pressure. At the same time, contractions of the trigone and relaxation of the pelvic floor musculature effect voluntary depression of the internal sphincter, causing the bladder base to descend and obliterate the posterior vesicourethral angle and straighten the posterior urethra. Micturition is completed by voluntary relaxation of the external striated urethral sphincter and a synergistic contraction of the detrusor urinae.

In summary, then, the continent bladder is dependent upon the integrity of the anatomic and physiologic relationship of the vesical neck and/or internal sphincter to the urethra, the bladder and urethra functioning as a synergistic unit during micturition. Krantz[2] has compared this unit to a lever of the first class with the external urinary meatus at one end and the bladder at the other, and with the ligamentous and muscular support at the vesical neck as a fulcrum. These supporting structures maintain the elevation of the urethra against the symphysis, elongating and angulating it at the vesicourethral junction to produce a sphincter-like action capable of withstanding sudden marked increases of intravesical pressure.

With Ullery's[1] definition of stress incontinence and the above outlined vesical dynamics in mind, the etiologic factors in stress incontinence may be considered to be (1) failure of the sphincteric action of the internal urethral orifice and (2) descensus of the bladder neck and urethra under conditions of exertion or stress.

The diagnosis of stress incontinence is based upon a careful analysis of the subjective symptomatology and objective findings interpreted in the light of the knowledge of the normal vesicourethral dynamics and their disturbances in stress incontinence. This underlines the need for a complete history and physical examination including a Marchetti test, cystoscopy, radiography, and urinalysis.

The Marchetti test or urethral elevation test is an extremely valuable aid in the diagnosis of stress incontinence. The bladder is filled to a capacity of 250 cc. and an area of the anterior vaginal wall estimated to be under the interureteric ridge is infiltrated with Novovain and grasped with an Allis forceps. With the patient in the supine and upright positions, increased abdominal pressure is induced by having her cough or strain, thus demonstrating the relative degree of incontinence. The bladder is refilled with 250 cc. of liquid, and the vaginal mucosa and bladder base are elevated toward the umbilicus by holding the Allis forceps firmly upward. With the forceps held firmly, the continence of the bladder with the patient in the supine and upright positions is evaluated against the cough-induced increase in intra-abdominal pressure.

The treatment of stress incontinence is nonoperative and/or operative. Nonoperative treatment consists of a therapeutic regimen of muscle education and resistive exercises which should be given a thorough trial before operative interference is undertaken. The

nonoperative regimen is directed towards re-educating and improving the function of the levator sling and the interdigitating extensions of the pubococcygeus muscle. The patient is taught to become aware of her ability to contract these muscles through association with other muscular functions in the pelvic area already under conscious control.

The Kegal perineometer, consisting of a pneumatic cylindrical diaphragm with an attached manometer, is a valuable adjunct in the re-education regimen. With the cylindrical diaphragm inserted into the vagina, contractions of the vaginal musculature are transmitted to the manometer and provide a simple means of exercising the pelvic and perineal muscles against resistance. The exercises are carried out by the patient at home for 20 minutes three times daily for a minimum therapeutic trial period of 3 to 4 months.

The operative procedures for the correction of stress incontinence are many and varied; however, I shall confine my discussion to those procedures which are directed toward correction of the pathologic changes in anatomy which have been established as the etiologic factors in stress continence.

The basic sling operation in use today is the Goebell-Frankenheim-Stoeckel operation. Strips of rectus fascia and pyramidalis muscle are freed from the abdominal wall down to their insertion into the pubic crest; the freed ends are passed downward behind the symphysis pubis and around the urethra as a musculofascial sling. A vaginal plastic operation consisting of plication of the muscular structures around the vesical neck is then combined with the sling operation.

The second type of operative procedure for stress incontinence is that described by Marshall, Marchetti, and Krantz,[3] in which the urethra, bladder neck, and bladder are suspended to the posterior aspect of the symphysis pubis. The space of Retzius is exposed by a suprapubic incision, and the bladder and urethra are separated from the posterior surface of the rectus muscle and pubis to within 1 cm. of the external urethral meatus. Sutures of no. 1 chromic catgut are placed on each side of the urethra in the vaginal wall, on each side of the vesical outlet, and firmly fixed to the periosteum of the symphysis, thus bringing the urinary passage upward and backward from the vaginal introitus. Additional sutures are then placed in the lower and lateral positions of the bladder and fixed to the posterior aspect of the rectus muscle. This vesicourethral suspension procedure may be combined with plication of the vesical neck, using the vaginal approach described by Ball.[4]

SUMMARY

The anatomy and physiology of the lower urinary tract have been discussed as they relate to the alterations in the dynamics of micturition in stress incontinence in the female. Etiologic factors of stress incontinence have been presented with an outline of the present-day concepts for the nonoperative and operative correction of this urologic problem.

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Hematuria Due to Lower Urinary Tract Lesions

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INTRODUCTION

Most of the etiologic factors giving rise to hematuria can be identified with present-day diagnostic facilities. Prerequisite to the utilization of mechanical aids to diagnosis is a careful history. The history must be carefully evaluated and correlated with the findings of examination so that the examiner will not draw false conclusions. There have been occasions when a bleeding site, viewed through a cystoscope, has been taken as the etiologic factor in hematuria when actually the bleeding was due to the traumatic effect of the passage of the instrument into the urethra or bladder. There have been other occasions when small indurated areas of the bladder appeared red and, perhaps, ulcerated, and these were assumed to be the bleeding sites, but the actual source of hematuria was found to be the upper urinary tract. These experiences are by no means singular.

The larger institutions throughout the country have provided information and statistics relative to hematuria, and this material is available to all. It is valuable to every surgeon.

ETIOLOGY

Interpretation of the clinical manifestations follows a logical sequence which I shall attempt to develop as the discussion proceeds. It is most important to stress that hematuria, whether gross or microscopic, is not a clinical entity or disease per se but rather a symptom necessitating immediate and sometimes exhaustive investigation to ascertain the underlying causative factors.

The presence of blood in the urine usually alarms the patient so that he seeks medical advice. Unfortunately, however, the bleeding may be intermittent in character, not accompanied by pain or discomfort, and, when it ceases spontaneously, a false sense of security is sometimes established. When the bleeding subsides, even the physician may minimize the gravity of the situation. Since the patient's general health seems unimpaired, he may appear to be justified in such a presumption.

Bleeding associated with lesions of the urinary tract, both benign and malignant, usually is not sufficient to produce the exsanguination observed in a patient with bleeding duodenal ulcer. Thus, the patient is not alarmed because the hematuria is not accompanied by symptoms of pain, exhaustion, or apprehension of exsanguination. Unfortunately, in many instances, the seriousness of blood in the urine is minimized, and the physician procrastinates in his investigation. Medi-

cation is prescribed, cystoscopy is deferred, and, when an accurate diagnosis is finally established, irreparable damage has occurred. I repeat, hematuria is not a disease for which medication should be prescribed. It is a symptom demanding complete cystoscopic survey.

In the highest percentage of cases, the source of bleeding is the kidney.[1] Lesions of the bladder form the next largest group. In this group, bladder tumors are the inciting causes in approximately 75 per cent of cases. Then, calculi and infections of various types including tuberculosis come next. Lesions of the prostate comprise approximately 15 per cent.

In a great many instances, the only complaint may be blood in the urine, either gross or microscopic. In the case of microscopic hematuria, the patient usually has never seen any blood in the urine. Rathbun[2] aptly said that, if every man practicing medicine could be impressed with the fact that, in 50 per cent of all cases, hematuria is produced by a tumor and that a large majority of these are malignant or potentially malignant, more would be done to reduce cancer mortality and morbidity than can possibly be done in any other way.

Higgins[3] reported a series of 1,600 cases of hematuria, in which he observed that calculi, tumor, infection, tuberculosis, and glomerulonephritis were the most frequent causative factors. He pointed out that further evidence of gross lack of appreciation of the significance of blood and blood cells in the urine can be seen by a review of the symptoms of carcinoma of the bladder. Hematuria was the presenting symptom in 79 to 85 per cent of cases. In spite of this warning symptom, an accurate diagnosis is established by cystoscopic examination in only 10.8 per cent within a month after the onset of bleeding, in 32 per cent within 5½ months, and in 51.7 per cent within a year. In reviewing such statistics, it is alarming to note the number of patients with cancer of the bladder who do not have the benefit of cystoscopic examination to establish the diagnosis until more than a year has elapsed from the onset of hematuria.

The significance of the detection of blood cells in the urine on microscopic examination must not be disregarded. The cause must be searched for; conjecture is not acceptable.

Hematuria may be associated with extraurinary conditions and may be manifested in the lower urinary tract. Acute appendicitis, diverticulitis of the colon, neoplasm of the colon, rectum, or pelvic structures, and acute and chronic salpingitis are examples. This brief classification of causes of hematuria is given only to indicate the extent of investigation that may be required to discover the contributory factor.

HISTORY

In taking a history of a patient, the term "blood in the urine" requires clarification. It may be that repeated urinalyses have revealed microscopic hematuria or there may be gross blood in the urine. Further investigation would be required to learn whether the hematuria is initial in type. If so, it probably originates in the anterior urethra. Terminal bleeding arises from the posterior urethra and the bladder. When the blood and the urine are well mixed, bleeding is usually from the bladder, kidney, or ureter. When hematuria is associated with interruption of the urinary stream, it suggests a tumor of the vesical neck or a bladder calculus.

Hematuria and past history of pulmonary tuberculosis with sanatorium care suggest the possibility of renal tuberculosis. Blood in the urine and family history of a parent or more than one member of the family succumbing to renal disease suggests the possibility of polycystic disease. A past history of a sore throat followed by edema and the voiding of smoky urine indicates the possibility of nephritis. Diseases such as deficiency diseases and blood dyscrasias may be suspected from information given by the patient. Myelogenous leukemia, hemophilia, and vitamin C deficiency may manifest hematuria.

DIAGNOSTIC AIDS

Although the history elicited from the patient is of value in determining the approach to the problem, in some instances it may be misleading. The presence of coexisting pathologic lesions must not be overlooked.

The value of a careful physical examination cannot be exaggerated. It may reveal the presence of hypertension, unilateral or bilateral renal masses, an enlarged spleen, edema, or other pathologic changes instrumental in the production of hematuria. Cystoscopic survey, including pyelography, even when the lesion has been discovered in the lower urinary tract, is necessary. Often it is not done because of economic factors. Nevertheless, it should be performed because there are numerous cases where pre-existing pathologic lesions of the upper urinary tract are present.

The physical examination, in addition to the urologic examination, should include a vaginal and/or rectal examination, which may disclose the presence of a malignant lesion which explains the source of blood in the urine.

Laboratory data, including blood studies, Addis determination, urea clearance studies, and blood chemistry investigations, may furnish enlightening information.

MANAGEMENT

Stones are not difficult to remove when they are located in the bladder. Small stones are removed either through the cystoscope or the resectoscope. Cystotomy is necessary for removal of large stones. The decision to drain the bladder by cystostomy for a few days depends on the choice and judgment of the operator. As a rule, I do not employ cystostomy drainage following removal of bladder calculi. When cystostomy is required because of infection or excessive bleeding, I usually drain the bladder with a no. 22 F. catheter brought out through a stab wound in the midline of the abdomen above the incision which, in the operations I perform, is usually transverse.

I believe an antibiotic sensitivity test is a valuable adjunct in the treatment of bladder infections, particularly protracted ones. This permits selection of a specific antibiotic, thus conserving time and money.

Ulcer of the bladder is not common, but it can cause a great deal of tribulation before it can be brought under control. Antibiotics, bladder irrigations with potassium permanganate or silver nitrate, and even very light coagulation by the electrocautery tip have all been used. I have found special medications, which have been recommended from time to time by various pharmaceutical houses, to be rather disappointing. However, urethral suppositories of Furadantin have proved quite effective in a few cases. The patient may use them daily and can insert them without assistance.

In management of bladder tumors, the first step is to obtain a specimen for biopsy. This is done with either the resectoscopic loop or with biopsy forceps through the cystoscope. All bladder tumors are poten-

tially malignant. In the case of a small polyp or cauliflower-like growths which do not penetrate beyond the mucosa, fulguration can be performed. Larger tumors must be classified according to the depth of infiltration through the vesical wall. If they do not penetrate beyond the muscularis, there is a reasonable chance of removing them by deep transurethral or transvesical resection. Tumors which have advanced to the serosa or beyond will usually be recognized by their broad base, and, on bimanual palpation, they can be felt to be either fixed into the surrounding tissue or thickened within the bladder wall. Tumors at the vesical neck or in the region of the ureteral orifices may be resected with the resectoscope or by cystotomy. Implantation of radon seeds, either transurethrally or by the open method, is effective in many cases. Deep irradiation therapy is quite disappointing, as many of these tumors are refractory to x-ray. Many ingenious devices have been offered for irradiation therapy, but the details are too lengthy to be presented in a paper such as this. A palliative measure, such as transplantation of the ureter to the skin or into the sigmoid, is often appreciated by patients with carcinoma because the pain of bladder distention so often is unbearable. I prefer to perform cutaneous ureterostomy because I feel that urosepsis, obstruction, and electrolyte balance can be better controlled.

Since new tumor formations are frequent, regular follow-up cystoscopic examinations are necessary in the management of all types of bladder tumors in order to permit their early recognition and destruction.

Hypertrophy and carcinoma of the prostate are common causative factors in hematuria. In the course of the urethra, neoplasms, polyps, calculi, strictures, and foreign bodies may be found. Obviously, treatment consists of removal.

Blood in the ejaculate is not uncommon and is usually of no significance, but it requires investigation by culture and/or guinea pig inoculation to rule out tuberculosis. Cancer of the seminal vesicles is usually associated with prostatic cancer.[3]

CASE HISTORIES

The following brief case histories illustrate conditions which may be associated with hematuria and serve to emphasize the futility of attempting to establish the diagnosis or estimate the gravity of the underlying pathologic lesions from the standpoint of the history elicited from the patient.

Case 1. A man 67 years of age stated that at varying intervals for 9 months he had observed a slight amount of blood in the urine. The bleeding was evident on two or three occasions and then stopped spontaneously. No pain or discomfort was evident, and the few drops of blood were noted only at the conclusion of urination. He consulted a physician who prescribed liquid medication. For 3 years the patient had had nocturia and had observed decrease in force of the stream and dribbling.

Cystoscopic examination revealed a tumor on the lateral wall of the bladder encroaching on the sphincter. The biopsy report was grade 1 carcinoma of the bladder. The growth was removed by transurethral resection. The patient has been living for 2 years without evidence of recurrence or new tumor formation.

Case 2. A man 69 years of age complained of blood in the urine. A few drops of blood had been observed at the end of urination for 6 months. The bleeding was intermittent and was not associated with pain or discomfort. One to 3 weeks might elapse when no bleeding was observed. He had had nocturia two or three times and weakness of the force of the stream and dribbling for 3 years.

Cystoscopic study disclosed the presence of prostatic varices. The varices were fulgurated with the resectoscope, and the patient has been free of symptoms for 2 years.

Comment.—The patients discussed are in the same age group and presented practically identical symptoms. The patient with cancer of the bladder had been given medication by a physician for 3½ months before cystoscopic examination was made. While these patients presented almost undistinguishable symptoms, in one carcinoma was present and in the other the lesion was not of a serious nature.

Case 3. A woman 57 years of age complained of blood in the urine and high blood pressure. Blood noticed in the urine 2 years previously had lasted for only 1 day. One year later blood was again detected in the urine, unaccompanied by other urinary symptoms. Medicine was prescribed at that time and in 2 weeks the bleeding subsided. Two years later, and one week preceding hospitalization for examination, blood again appeared in the urine and, at this time, was accompanied by casts. A diagnosis of nephritis had been made elsewhere.

The previous diagnosis of hypertension and nephritis was confirmed. Because of the hematuria, a cystoscopic study was made which revealed a large papillomatous tumor in the region of the left ureteral orifice. This growth was resected and radon seeds were placed in the base. The pathologic diagnosis was papillary carcinoma, grade I. A new tumor developed 1 year later which was fulgurated. During the last 3 years there has been no recurrence of new tumors.

Comment.—Here again a physician prescribed medication for hematuria without having determined the source of the bleeding. Two years later a diagnosis of nephritis was made and confirmed. When a cystoscopic examination was performed, however, the correct diagnosis was found to be carcinoma of the bladder, nephritis, and hypertension.

CONCLUSION

Hematuria is not a disease nor should medication be prescribed until a complete urologic study has been made to determine the underlying cause. The public must be informed of the serious aspects of hematuria and be advised to seek immediate medical consultation when the condition is first observed.

Correct diagnosis and evaluation of the situation will usually lead to proper management. Each case requires a variation of approach in accordance with the findings. The only point which I wish to stress is that periodic follow-up of this type of condition is mandatory. The length of time between cystoscopic studies is usually determined by the findings at the first follow-up cystoscopy. I have one case in which cystoscopic survey is required every 2 weeks in order to destroy small budding papillomas. Others may require cystoscopic examination only every 3 months.

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Scrotal Masses

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The scrotum is a contractile, flexible sac, situated behind the penis and limiting the anterior part of the perineum. It contains the testicles, the epididymis, and the spermatic cords. There is a septum in the scrotum, noted externally as a slightly raised raphe, which divides the scrotal cavity into a right and left portion. Beneath the skin is the dartos, a very loose layer of connective tissue.

The arterial supply is composed of the superficial perineal branches of the internal pudendal posteriorly and the external pudendal branches of the femoral anteriorly, with the corresponding veins accompanying the arteries. The lymphatics drain into the inguinal and femoral nodes. The nerves are the perineal branches of the pudendal, the external spermatic branch of the genitofemoral nerve, the perineal branches of the posterior femoral cutaneous nerve, and the anterior scrotal branches of the ilioinguinal nerve.[1]

The scrotal contents are constantly exposed to injuries. Because of this exposure, special supportive and protective devices have been manufactured.

HYDROCELE

One of the conditions most commonly looked for in examining the male infant is cryptorchism. In the adult male, the scrotum is examined for masses, especially hydrocele. This is a collection of serous fluid within the tunica vaginalis proper. There are different types of hydroceles, including the vaginal type extending into the tunica vaginalis; the congenital type, into the open funicular and vaginal process with free communication into the abdominal cavity; and the infantile and bilocular types, which are acquired and can be acute or chronic.

The common type of hydrocele contains varying amounts of clear, straw-colored fluid, forming an oval scrotal mass. The fluid practically surrounds the testicle, which lies on the posterior scrotal wall. The sac is tense and translucent. The tunica vaginalis may be thickened, fibrinous, cartilaginous, calcified, or even papillomatous. Transillumination may be impaired by hemorrhage, cholesterol crystals, adhesions, or because of the thickened tunica vaginalis. While the condition may occur at any age, it is more frequently seen in the middle-aged or elderly male.

Hydrocele is usually painless but is annoying owing to the weight of the mass and mechanical or positional interference. A large hydrocele may contribute to impotency by interfering with the sexual act.

Treatment can be palliative or curative. Surgery is performed under general or spinal block anesthesia. After proper preparation for surgery, the incision is made near the base of the scrotum, through the skin and dartos, and the loose cellular tissues are divided until the tunica vaginalis is exposed. It is further separated from the hydrocele by blunt dissection or by scissors, until the entire hydrocele sac can be delivered from the scrotum. The fluid is aspirated, measured, and examined. The sac is incised and everted as in the bottle operation. Excess tissue is removed. A few sutures are placed to approximate the edges of the sac and secure it behind the cord. It is imperative that hemostasis be accomplished before the testicle is returned to the scrotum. The scrotal incision is closed, and a rubber drain is placed at the dependent portion of the wound.

I always advise the referring physician that postoperatively, for a few days, the scrotum will appear as large as, if not larger than, with the hydrocele. Then the inflammatory reaction will subside.

Some surgeons remove the excess tissue of the sac, and some do not. I no longer remove the excess tissue, and find there is less postoperative edema of the scrotum. By cutting into and removing excess tissue and ligating the many bleeding vessels resulting from its excision, greater edema of the organ is produced because of the greater cell destruction and alteration in circulation. If the excess tissue is allowed to remain in the sac, it will eventually atrophy.

Palliative care of the hydrocele may be effective in some cases, but usually frequent aspiration is necessary. A sclerosing solution may be used to promote adherence of the secreting lining.

When aspiration is performed in treatment of hydrocele, there exists a possibility of injury to a vessel and production of a hematocele, which may occur suddenly and which is not transilluminated. This may also occur when too rapid emptying of a hydrocele by tapping causes collapse of the veins which had been on tension.

HEMATOCELE

In acute hematocele, treatment is rest in bed, elevation of the scrotum, and application of an ice bag. Some physicians advise moist heat. Aspiration of bloody fluid, under sterile technic, is made with a large trocar and cannula. A local anesthetic is injected into the scrotal skin.

If bleeding does not stop and swelling continues, surgery will be necessary. This is similar to treatment for hydrocele, with evacuation of the clots and hemostasis. If the condition has advanced to thickening of the tunica vaginalis with atrophy and fibrosis of the testis, orchidectomy may be necessary.

SPERMATOCELE

A spermatocele appears as a cyst or cysts of the tubules of the epididymis. It is believed to be congenital and can be easily diagnosed by the presence of spermatozoa in fluid. These rounded cysts are usually multiple and involve the epididymis and the spermatic cord. In some apparent hydroceles in which the testicle was posterior (usually the testicle is posterior in hydrocele and anterior in spermatocele), aspiration of a cloudy fluid filled with spermatozoa has changed my diagnosis to spermatocele.

Treatment is complete excision with care not to alter the testicular circulation and thus produce atrophy of the testicle.

PYOCELE

Pyocele, a collection of pus in the tunica vaginalis, may occur as a complication of hydrocele or hematocele. It may contaminate a pre-existing hydrocele or hematocele after aspiration or it may occur following scrotal injury.

VARICOCELE

Varicocele is the term for tortuosity and dilatation of the spermatic veins in the scrotum. It is found more often on the left side than on the right, possibly be-

cause the left spermatic vein empties into the left renal vein at a right angle, whereas the right spermatic vein enters obliquely into the vena cava.[2] Compression of the veins by abdominal tumors, renal neoplasms, and improper sexual hygiene must be considered as causative factors in varicocele production.

The enlarged, tortuous veins can be palpated through the scrotal skin. When the patient is in the erect position, they feel like a pack of worms, but cannot be palpated when the patient lies on his back. It is well to remember that varicocele due to abdominal tumor will not empty. Treatment in most cases consists of wearing a scrotal suspensory for relief. When there is severe pain and gross enlargement, ligation of a portion of the enlarged vein and excision of the segment is advised.

In the past, many surgeons excised this segment just below the external ring. However, since studying Palomo's[3] description of his technic, I have adopted it. A short inguinal hernia incision is made through the external oblique aponeurosis. The internal ring is palpated, and fibers of the internal oblique and transverse muscles are separated about 2 cm. above the internal inguinal ring. The varicosed veins are clamped, cut, and ligated by a transfixion suture of No. 1 chromic catgut. In this way, the middle and posterior groups of veins are not injured, and there is therefore less possibility of atrophy of the testicles. The external oblique aponeurosis is approximated by interrupted sutures of No. 20 cotton. Interrupted sutures of like strength are used for the skin margins. Ambulation is permitted, but the patient must wear a scrotal suspensory for at least 7 days.

CYSTOCELE

The possibility of scrotal cystocele must always be considered in scrotal hernia. This bladder hernia presents symptoms of frequency, nocturia, dysuria, hematuria, and two-stage urinary evacuation. Normally, there is residual urine, and the condition can best be diagnosed by cystography. It is treated by hernioplasty after replacement of the unopened bladder.

TORSION OF THE SPERMATIC CORD

Torsion of the spermatic cord may present itself with a sudden onset, marked pain, and swelling of the testicle. The condition may result from minor or serious injury, or the history may reveal no cause.

The patient may complain of nausea, vomiting, and sweating and present a picture of shock. The condition can be confused with acute epididymitis or strangulated inguinal hernia. There is a swelling near the external abdominal ring which is very tender and irreducible, and there is a definite change in the position of the epididymis in relation to the body planes.

Occasionally, the torsion will reduce spontaneously or will respond to manipulation, but prompt surgical intervention is indicated if the torsion does not respond to these measures. If it is not corrected in a short time, necrosis of the testicle will result. Too often there is a potential torsion on the opposite side, and at operation the possibility of an elongated, hypermobile cord or abnormally mobile testicle should be investigated.

EPIDIDYMITIS

Usually, any inflammatory condition of the scrotal contents is termed orchitis. However, there is a definite distinction between lesions of the epididymis and the testicle: Epididymitis usually follows inflammatory disease of the posterior urethra, and architis seldom occurs except as part of a metastatic inflammation, such as mumps, or by extension from a diseased epididymis.

Epididymitis can be catarrhal or purulent inflammation of the tubules and interstitial tissues. The inflammation may terminate either by resolution with scarring and fibrosis or in abscess formation. Many cases terminate in sterility when the tubules are blocked by the inflammatory changes.

In acute epididymitis, pain, fever, malaise, toxic symptoms, muscle soreness, nausea, and vomiting are present. At first nodules can be palpated in the lower pole; later the entire epididymis is involved and swollen. In the chronic form there is slight pain with a sensation of weight on the affected side. There are nodules present in the lower epididymal pole.

Treatment may consist only in wearing of the scrotal suspensory. If there is fever, bed rest, with the testicles elevated, consistent application of moist heat, and narcotics and sedatives for relief of pain should be prescribed. All urethral intrumentation is stopped and sulfonamide and antibiotic therapy begun. If an abscess is present, incision and drainage may be necessary. Ligation of the vas deferens may be required to prevent recurrence. In many chronic cases, as the infection progresses and suppuration advances, epididymectomy or orchiectomy may be required.

Gonorrheal, tuberculous, and nonspecific types of epididymitis must be differentiated.

ORCHITIS

Usually inflammation of the epididymis involves the testicle to produce a form of orchitis. More often orchitis is the metastatic type, as in mumps. It can go on to gangrene and atrophy of the testicle because of the parenchymatous tissue swelling within the fibrinous tunica albuginea, which, in turn, can cut off the blood supply to the testicle.

In orchitis, there is usually severe pain in the testicle, with increasing and continued fever. The testicle is large and tender. As a rule, the epididymis is of normal size. Sudden cessation of pain may be due to rupture of the tunica albuginea, with possible gangrene of the testicle.

It may be necessary to incise the tunica vaginalis in order to relieve tension and prevent gangrene and testicular atrophy. Rest is necessary, with elevation of the testicle and application of moist heat to the area. The patient's reaction should be a guide as to the use of cold applications. Gantrisin therapy is given, with analgesics and sedatives for relief of pain.

In cases of chronic orchitis, where there is a possibility of tumor, the Aschheim-Zondek test should be performed; however, in such cases I prefer to perform orchidectomy. I believe it is better to remove a chronically inflamed, questionable testicle than to permit a possibly malignant organ to remain.

Case 1. A well-nourished, white male of 57 complained of an enlarged testicle on the right side, with pain radiating into the right inguinal region. There was a history of a respiratory infection 3 weeks previously. One week later, while having a bowel movement, the patient bore down and suddenly complained of a cutting pain in the scrotum, with sudden enlargement of the right testicle. On examination it appeared to be three times the normal size and did not admit light on transillumination. There was no burning on urination, no chest pain or cough, and no history of abdominal or flank pain. He was given penicillin and sulfonamides for the respiratory infection and ad-

mitted to the hospital with a diagnosis of orchitis and hematocele. The leukocyte count was 12,800, urine culture showed hemolytic streptococci, and the Aschheim-Zondek test was negative.

At operation, a large thickened chronically inflamed testicle was removed. Orchidectomy was performed from above downward, and a large portion of the spermatic cord was also removed. The pathologic report was chronic, advanced granulomatous orchitis.

TESTICULAR TUBERCULOSIS

Tuberculosis of the testicle is secondary to tuberculosis of the epididymis. Adherence to the skin and rupture of the caseous areas with fistulous formation are often observed. In tuberculosis of the epididymis, if the nodules in the upper pole can be palpated, epididymectomy should be performed. If there is tuberculosis of the testicle, orchiectomy is performed. If fistulous tracts are present, liberal portions of the adjacent skin are excised.

TUMORS OF THE TESTES

Neoplasms of the testicle are rare. Authorities differ widely as to the histologic category, so I classify all frankly neoplastic testicular enlargements as benign or malignant. However, innocent testicular growths are so rare that it is deemed advisable to regard all neoplasms of the testicle as malignant, but there is a great variation in their degree of malignancy. This is of secondary importance compared to early diagnosis and immediate surgical intervention.

Microscopic section shows two main varieties, the teratoma and the seminoma.

Teratoma.—

Teratoma commonly occurs between the ages of 20 and 40 years. It is a mixed tumor, arising from the primitive totipotent germ cells, and all three germinal layers may be represented. One usually predominates and achieves malignancy. Chorionepitheliomas, which are extremely malignant, are rare, as are dermoids which are innocent and appear in the first year of life, and consist of a cyst lined by squamous epithelium and filled with sebaceous matter and hair. There may be other structures present such as nerve tissue. Embryonal malignant tumors consist of solid and cystic portions. The solid structure may present masses of malignant cells, squamous and transitional cells, and adenocarcinoma as well as myxomatous tissue, cartilage, striped or plain muscle, and thyroid tissue. The cystic areas may be lined with squamous or cuboidal cells, testicular spaces, the remainder of seminiferous tubules, and structures similar to alimentary canal epithelium.

The tumors vary in size, are honeycombed by numerous cysts, and present areas of hemorrhage, necrosis, and cartilage. Most cases present a capsule. The normal testicular tissue in the mass is compressed and is usually found in the upper pole of the mass.

Seminoma.—

Seminoma occurs commonly between ages of 30 and 50 years. It is a carcinoma arising from the seminiferous epithelium. It is slower in development than teratoma and is considered less malignant because it is slower to metastasize.

Structurally homogeneous, the cells are round or slightly oval, resembling normal spermatocytes. There are very few, if any, cysts, and the solid or semisolid tumor mass is subdivided into segments by fine fibrous tissue septa with a fairly well-marked capsule. Areas of necrosis are noted, but hemorrhagic areas are few. There seldom is invasion of the epididymis.

Symptoms and Diagnosis of Testicular Tumors.—

With testicular tumors there is usually complete absence of pain and tenderness. The first sign of the growth is a feeling of weight on one side of the scrotum.

The body of the testis usually is uniformly enlarged, hard, and heavy. At first, the surface is smooth, but then becomes irregular and nodular with areas of softening. Usually there is a secondary hydrocele which is larger in cases of seminoma.

The cord becomes thickened due to the increased size of the cremaster muscle as well as to enlarged veins. The epididymis becomes involved late, by direct extension of the mass. The findings at rectal examination are normal, and the urine is free from abnormal constituents, except for a gonadotropic hormone (prolan).[2] The spread of the neoplasm depends upon its structure. It is very rapid in chorionepithelioma, less so in teratoma, and slowest in seminoma. Direct spread is first up the tunica vaginalis and then to the epididymis, the cord, and the scrotal skin. It spreads to the lower lumbar glands, then the upper lumbar, intrathoracic, prevertebral, paravertebral, and finally to the cervical glands.

Tumors of the testicle metastasize by way of the blood stream to the lungs and to the inguinal lobes and to the deep retroperitoneal nodes by way of the lymph channels.[2] The most common metastasis is a unilateral or bilateral deep-seated abdominal mass in the region of the kidney or anterior to the vertebral column.

After rapid growth of the retroperitoneal spreading tumor, there is nausea, vomiting, abdominal distention, backache, and ascites, with edema of the abdominal wall, the back, and the legs. With compression of the renal veins, renal failure may occur. Intrathoracic metastasis produces dyspnea, hemoptysis, and enlargement of cutaneous veins of the chest. If multiple tumor nodules are noted in the lungs of a man less than 45 years of age, a testicular neoplasm should be looked for.

It is important to make a correct diagnosis at an early stage, while the disease is confined to the testicle. At best, the prognosis is grave; with metastasis, it is hopeless.

Neoplasms must be differentiated from hydrocele, hematocele, tuberculosis, and syphilis of the testicle.

The Aschheim-Zondek reaction is positive in a large proportion of cases, but a negative test does not prove the lesion is benign.[2] The urine of a patient with a malignant testicular tumor contains prolan A, a gonadotropic hormone. The urine injected into the female mouse, rat, or rabbit causes changes similar to those involved in the hormonal test of pregnancy. It has been demonstrated that within several weeks after removal of the tumor a positive reaction changes to negative.

Treatment.—

Treatment is surgical removal of the testicular mass and resection of the spermatic cord to the level of the external inguinal ring followed by roentgen therapy to the groin and abdomen. Radical operation, with excision of the preaortic and retroperitoneal lymph glands is of doubtful value, as the mortality rate is approximately the same as for the other procedure, and may be greater.

Orchiectomy should be carried out in a retrograde fashion by ligating and sectioning the spermatic cord at the level of the external ring before dealing with the

testis. Owing to the high mortality rate and poor prognosis in testicular tumors, orchiectomy is justifiable in doubtful cases.

Recently, I had two cases that presented painless testicular masses. The Aschheim-Zondek reaction was positive. After orchiectomy, tissue report on both indicated chronic orchitis. The case reported below is in direct contrast.

Case 2. A white male, 28 years of age, was admitted to the hospital with a complaint of swelling of the right scrotum. He first noticed the swelling 4 months previous to admission, and there had been a gradual increase in the size. Four weeks before admission the patient complained of an annoying dragging sensation and irritation from the rubbing of the scrotum against the inner thigh.

On examination, the right testicle was three times its normal size. There was some transillumination showing a larger than normal outline of the testicle. The inguinal glands were not enlarged. The Friedman test was negative. The admitting diagnosis was hydrocele. At operation, after the hydrocele sac was incised, a diagnosis of teratoma was made. Retrograde orchidectomy with removal of a large portion of the cord was performed. The pathologic report was teratoma testis.

Postoperative radiation therapy was begun to the right iliac, lumbar, hypochondrial, sacral, dorsal and mediastinal areas, and to the right and left supraclavicular regions. Marked nausea early in the therapy caused the patient to refuse completion. The 4-year follow-up showed no recurrence.

CONCLUSION

The scrotum certainly should not be considered lightly in a routine physical examination, since it is the site of many pathologic conditions. When these are discovered, therapy depends upon the experience of the physician treating the condition. In his hands rests the future of the patient, and he must consider the problem carefully, intelligently, and respectfully.

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Retropubic Prostatectomy

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Early in my general practice I learned several technics for tonsillectomy before I finally adopted the Ruddy method. When, after 20 years, I decided to specialize, I surveyed the field of prostate operations and finally selected the retropubic prostatectomy technic devised by Millin.[1] However, there are times when retropubic prostatectomy is not indicated, and in these cases, depending on the indications, I perform transurethral resection, the enucleation operation of Fuller-Freyer, or enucleation combined with the Millin technic.

Historically, one of the first reports of retropubic prostatectomy was that of Van Stockum of Rotterdam in 1908.[1] He performed two operations in that year. Otto Maier of Innsbruck in 1924 reported a series of four operations. He used the inguinal approach as used to correct a hernia. The patients were reported to have done well. In 1934, two Americans, Casper and Jacobs, enucleated the large lateral lobes, leaving the prostatic urethra intact. Their success was varied, but it did prove the operation could be done. In 1945, Millin[1] noted the excellent exposure of the prostate during total cystoprostatectomy and later that year performed his first retropubic prostatectomy. From that time on, he continued using the retropubic approach, perfecting the technic with each successive operation.

The preoperative care of any patient is influenced by the general appraisal of his condition. Indwelling catheter drainage is instituted for any patient who has retention on admission. The usual minimal laboratory work includes a complete blood count, urinalysis, and nonprotein nitrogen and blood sugar determinations. If there is any doubt as to the cardiac status, consultation is sought with the internist and appropriate restorative measures instituted before operation. Preoperative chest x-rays are always taken.

Only after the correction of all blood deficiencies, gross urinary sepsis, cardiac decompensations, and the patient's mental block (and this is important) is the patient ready for surgery. It may take weeks to coordinate all of these, but, on the other hand, the patient may be ready in a day or two. However, it is possible to overtreat the patient and pass the ideal time for operation. I have found that such patients have a stormy recovery.

The evening before operation, the patient is visited by the anesthetist. He examines the patient, giving special attention to the cardiac reserve and chest findings. This is the man on our surgical team whose important duty is to watch the patient throughout the operation and for the next 24 hours. He chooses the type of anesthesia he thinks best for the patient and the other supportive agents that may be necessary.

For the most part, I have had the services of an anesthetist who gives peridural block. It is technically more difficult to give than other types of blocks, but it somehow checks hemorrhage, there is less drop in blood pressure, and it is well tolerated by the majority of patients. Other supportive anesthetic agents will blend with this type of anesthetic and are also used. Silva de Assis[2] reported over 1,000 cases in which peridural block was used.

After the patient has been brought to surgery, and the anesthetist has performed his needling task, I examine the patient cystoscopically. Usually no cystoscopic examination is made prior to surgery as I know it has weakened many patients and prolonged postoperative recovery. One may be surprised to find

calculi in the bladder. The extent of trabeculation is noted, and this gives a hint as to the patient's eventual control of his stream following operation. Where multiple diverticula are noted and the bladder capacity is over 1,000 cc., prostatectomy is not going to be satisfactory to the patient.

Following cystoscopic evaluation, the bladder is irrigated with a 1:10,000 solution of Zephiran and emptied. Routine bilateral vas ligation is then performed. Some surgeons rely on antibiotics to prevent postoperative inflammation of the epididymis, but I ligate the vas as an additional means of prevention. Epididymitis following prostatectomy causes the patient more discomfort than the operation itself. By this time the anesthetist has obtained the proper level of anesthesia and the operation can begin.

The operator stands on the patient's left. After the patient's buttocks are properly placed over the kidney elevator, the table is raised to its maximum height. This aids in fully exposing the space of Retzius, and this maximum exposure is necessary. The abdomen is then opened in the midline, the incision extending from the symphysis to the umbilicus. After the rectus muscles have been separated, the right index finger is carefully introduced just beneath the symphysis and drawn upward, opening the retropubic space. The transversalis fascia is encountered here and may be so tough that it requires separating with scissors. Blunt dissection must be carried out carefully and all bleeding vessels tied.

A retractor can now be placed in the opening. Presman[3] states that a standard laparotomy set can be used for the operation. This is possible, of course, but I believe use of the Millin instruments makes for speed and ease in this operation.

The prostatic capsule is now in view, and is carefully cleared of its adherent fat with a sponge on a long forceps. It is necessary to proceed with care and tie any little bleeding vessel while it is yet visible. Packing material is introduced laterally into each side of the prostate. I use a gauze square, opened and refolded into thirds. If the gland is high and well exposed, packs are not necessary.

A suture over the anterior prostatic plexus is now taken using no. 0 chromic catgut on a thick Mayo needle. This suture site is in the midline of the capsule and about 0.5 cm. from the bladder neck. Another suture is taken just at the bladder neck and in the same parallel line. The capsular incision will be between these sutures and, in closing, will act as a guide in correctly approximating the tissue.

Next a transverse incision is made over the right lateral lobe; suction from a tonsillar suction tip is used to keep the oozing blood cleared from the field. This incision should be fairly deep and about 1 inch long. One of the T-capsule forceps can now be applied. One end is worked between the adenomatous tissue and the capsule, and if the forceps is in the correct line of cleavage, the tissue will almost dissect itself away. This forceps controls the bleeding of the severed capsule. A like incision is made on the left and linked with the incision on the right. If the suture is taken through the capsule before its separation, there should be little or no bleeding at this point.

If there is not much space in which to work the retractor can be removed, or it can be left in place if the gland is well exposed. The T-forceps can also be removed. The two sutures which were left long act as guides as gland dissection is started.

The right index finger is inserted along the lumen of the prostatic urethra between the lateral lobes to the apex of the prostate. Enucleation is now started, working from the apex of the gland to its base. The prostatic urethra is best severed with scissors. This prevents any avulsion of the membranous urethra and injury about the sphincter. With wide, sweeping motions of the index finger, the lateral lobes are easily exposed at the surface of the capsule and can be delivered separately or together, according to the size of the gland and the opening.

If the retractor has been removed, it is now replaced. The opening into the bladder is identified with the suction tip and is grasped with an Allis or bladder neck spreader forceps. The lobes are now carefully dissected free about the bladder neck and beneath the trigone of the bladder. This is done with scissors, but I have also used the Ruddy tonsil dissector. When the gland is freed and delivered, a warm pack is placed in the prostatic bed and the two lateral packs removed.

The prostatic bed is then inspected for mucosal tags, bleeding, and extra lobes. Some operators place one finger in the rectum and one in the exposed capsule to be sure none of the hypertrophied prostate remains. Bleeding vessels can be grasped and tied or coagulated; I prefer tying.

The bladder floor is now picked up with an Allis forceps, and a generous U-shaped wedge is cut out around the clamp. It is better to be generous with this cut than not take enough tissue. Postoperative contractures of the bladder neck will be avoided and it is easier than tying this lip to the floor of the prostatic capsule. If there are any stones in the bladder, they can be removed at this time. Should the stone or stones be too large to be delivered through the bladder neck opening, the opening is enlarged with scissors, by cutting transversely through the neck. It can be immediately repaired with a chromic no. 00 suture.

A Foley no. 22 one-way catheter with a 30 cc. bag is now threaded through the penis and directed onto the bladder. About 15 cc. of water are placed in the bag and it is clamped off. Some operators[4] pack the capsule with Oxycel, but I think this may cause stricture of the newly formed prostatic urethra. In addition, in my experience, as the Oxycel digests and comes away, it plugs the catheters and turns the drainage to a reddish color which excites the interns and nurses, who think the patient is hemorrhaging.

The capsule is closed with a running stitch of no. 1 chromic catgut on a small Mayo needle, with the suture starting at the lateral canthus of the incision on the right. This operation is repeated on the left by the assistant or the operator. Pearlman[5] believes that the surgeon should change positions with the assistant when suturing the capsule, and suture away from the bony pelvis, pointing the needle toward the bladder at all times. He says this tends to minimize osteitis pubis. The two sutures are tied in the midline and should approximate the sutures previously placed to control the bleeding of the anterior plexus. These two sutures can also be tied at this time and the suture line inspected for bleeders.

At this stage it is wise to test the catheter with water to see that it is open and draining well. Any leaks in the suture line of the capsule can also be noted and repaired. The kidney elevator can now be lowered. An unfilled Penrose drain is split down the center for

3 inches and each end is placed laterally over the prostatic capsule. This takes care of any serum drainage and the area is finally sprinkled with sulfa powder before closure.

The abdomen is closed in layers. The muscle is loosely sutured with two or three ties of no. 00 chromic. The fascia is closed with no. 0 cotton interrupted sutures, and the skin is approximated with cotton or Dermalon. The catheter is again checked and irrigated before the patient is returned to his room.

The indwelling catheter is connected by a wide-lumen glass adapter to tubing emptying into a drainage bottle. The catheter is taped to the thigh with 1-inch tape so the patient may roll about freely and not have the catheter tugging on the bladder. If the catheter is draining freely, routine irrigation is not performed. Normal saline is used occasionally to irrigate the bladder and keep the line free of clots.

Since many elderly men tend to be dehydrated, intravenous fluid, 2,000 cc. daily of 5 per cent glucose in water with multiple vitamins added, is given for at least 2 days postoperatively. One injection of Bicillin, 1,200,000 units, and triple sulfa, usually Gantrisin, 1 gram orally every 6 hours for 5 days, are prescribed. A sedative, morphine, 1/6 grain, changing to APC with codeine, ½ grain, is given for pain, although patients are relatively free from pain following this operation. Ascorbic acid, 1,000 mg. in divided doses, is administered three times a day with a high caloric diet. Needless to say, the patient is urged to drink large quantities of water.

The patient is encouraged to sit on the edge of the bed on the second postoperative day and in a chair on the third day. If he does not turn freely in bed on the first day, his position must be changed frequently. The catheter and Penrose drain are usually left in place for 5 days. If there is any leakage through the suprapubic incision, a catheter may be reinserted; however, I usually wait 3 days and, in all cases, the wound has completely healed and reinsertion of the catheter has not been necessary.

The patient returns to the office in 4 weeks, and at this time I usually pass a no. 24 to 26 F. sound. If there has been a tendency toward slight dribbling or poor control, passing the sound promotes an early end to these symptoms. It has been my experience that less postoperative care and fewer office visits are required than following other types of prostatic surgery.

Limitations of space prevent discussing the radical operation for prostatic cancer performed via the retropubic route. Chute[6] recently gave an excellent description of the complete procedure for radical retropubic prostatectomy.

CONCLUSIONS

1. Retropubic prostatectomy is an improved method of suprapubic enucleation having the advantage of complete visualization.
2. Careful attention to detail is imperative for ease and speed in the operation.
3. The operation is not difficult to learn, and mastery requires much less experience than transurethral electroresection or perineal prostatectomy.
4. Complications are few and, when encountered, are usually due to deviations from the original technic outlined by Millin.

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Hydronephrosis

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Hydronephrosis is the retention of urine in the renal pelvis and calyces. In the presence of interference with the expulsion of urine, the resultant stagnation causes dilatation of the renal pelvis and its calyces and, subsequently, atrophy and destruction of the parenchyma of the kidney.[1]

ETIOLOGY

Hydronephrosis, which primarily begins with dilatation within the renal pelvis and calyces, results in atrophy of the parenchyma in proportion to the extent of back-pressure on the kidney.[2] Depending on the amount of fluid retained, hydronephrosis may be classified as small, medium, or large. The normal capacity of the pelvis of the kidney is from 4 to 8 cc., and retention of more than 15 cc. may be considered dilatation. The condition may be present in one or both kidneys.

The urine which is retained can be aseptic or infected. In the presence of infection, hydronephrosis differs from pyonephrosis in that pyonephrosis is a definite necrosis of the renal parenchyma as a result of ulceration and cellular destruction, while in hydronephrosis the parenchyma atrophies and disappears as the result of increased intrarenal tension and nutritional interference.[1-3]

Hydronephrosis is primarily caused by obstruction, which may be mechanical or dynamic,[2] and may be anything which diminishes the caliber of any tubular part of the urinary tract, including the infundibulum, ureter, and urethra, either by pressure from the outside or by a constriction resulting from some abnormality in the wall of the tubular structure. The site of occurrence of mechanical causes may be anywhere along the entire urinary tract from the ureteropelvic junction to the urethral meatus. The numerous and varied mechanical causes of obstructive uropathy can be classified as congenital or acquired, but secondary renal changes invariably occur regardless of the nature or position of the cause.

In a much smaller percentage of cases urinary obstruction results from neurogenic or muscular dysfunction of some part of the urinary tract, and the cause is then a dynamic one. Ureterectasis is very often associated. However, cases of congenital hydronephrosis in which there is no involvement of the ureter are not

unknown. Hydronephrosis and ureterectasis may also develop secondarily as the result of urinary stasis due to some type of neurogenic dysfunction of the bladder. It may also occur primarily and independently as the result of disturbances, most commonly of congenital origin, in the innervation of the ureter and the renal pelvis.

I agree with Wesson[4] who says, "Every hydronephrosis is the direct result of . . . obstruction to the free flow of urine under normal physiologic conditions of pressure and peristalsis." The obstruction may be partial or complete, but it must be constant and exist over a considerable time in order to cause dilatation of the renal pelvis and its calyces. Fundamentally, the effects of obstruction on the kidneys are the same whether the block occurs in the urethra, the bladder, or along the course of one or both ureters. The lesion will be governed according to the severity of the obstruction, and, in some instances, the distance of the obstruction from the kidney. An obstruction to urinary flow at any point has no direct effect on any part of the urinary tract below the point of obstruction, but it does have a direct effect on every part of the urinary tract above the point of obstruction. Any type of obstruction below the level of the renal pelvis will sooner or later result in dilatation of the renal pelvis and its calyces unless relieved.

PATHOLOGY

The changes in the renal pelvis and parenchyma result from the blockage of the normal urinary flow and the same pattern is presented regardless of whether the blockage is partial, intermittent, or permanent.[2] In noninfective hydronephrosis the papillae flatten, and the medulla of the kidney gradually thins. The cortical zone of the kidney gradually atrophies until there is only a thin wall of the parenchyma. At first, the hydronephrotic fluid is urine, but as the pressure atrophy of the parenchyma increases, the fluid becomes more dilute until it consists of only water and salt.

As soon as obstruction causes the pressure in the pelvis to rise above normal, the renal function is depressed because the urine cannot flow freely from the collecting tubules into the pelvis. If the obstruction continues for a long time, the increased pressure in the pelvis and collecting tubules causes the tubules to dilate. This dilatation causes pressure upon the capillary networks which surround the tubules and cuts down the blood flow through the kidney. The resulting renal ischemia gradually brings about degeneration and absorption of the parenchymal cells (tubules and glomeruli). The process is known as hydronephrotic atrophy. The pelvis and calyces are enlarged to take the place of the destroyed parenchyma, resulting in hydronephrosis. In later stages the parenchymal destruction may be so great that the kidney becomes a thin-walled sac, and, if not infected, the sac may grow to great size and contain many liters of fluid. In infected hydronephrosis the turbidity of the fluid varies in definite relationship to the number of leukocytes present. Occasionally the fluid is bloody; hemorrhage may be slight or extensive.

SYMPTOMS

What are the symptoms of hydronephrosis? I wish to place particular emphasis on this phase of the subject, for there is no typical symptomatology produced by hydronephrosis. In many cases I have found almost complete destruction of one or both kidneys, and yet the patient had no subjective symptoms referable to the urinary tract.

I have discovered advanced kidney destruction on routine urologic examination prior to abdominal or pelvic surgery or for further study of some minor deviation from normal in the urinalysis made in connection with a physical examination for insurance or employment. In one case, a 20-year old male applied for a position in industry, and during the course of physical examination was found to have pus in the urine with 4 to 5 hyaline casts per high power field; employment was refused until further examination was made. His only complaint was slight left back pain, radiating to the left lower quadrant, which disappeared during the day and had been present for 2 months. He gave a subjective history of poliomyelitis at 6 weeks of age and of enuresis all of his life. He had been under various types of treatment for bed wetting but had obtained no relief. Urologic survey disclosed advanced bilateral hydronephrosis due to ureteral obstruction in the upper third causing irreversible damage to the kidneys. In another case a 37-year old female presented herself for examination at the request of her physician because of persistent gross pus in the urine. The patient had received chemotherapy for many months with no decrease in the amount of pus found at urinalysis. The patient gave no subjective history of pain or discomfort but had suffered one bout of urinary frequency which cleared in a matter of a few days. Cystoscopy and retrograde pyelograms disclosed marked destruction of the left kidney due to obstruction over a long period by a large ureteral calculus located in the intramural portion of the ureter. There was considerable ureterectasis present with the ureter grossly dilated at the area of obstruction.

I have found reflex manifestation of gastrointestinal symptoms, chiefly nausea, vomiting, constipation, obstipation, abdominal gas, and abdominal distention, to be among the cardinal manifestations of kidney disease. In many cases the patient is treated for ulcers, slowly functioning gallbladder, gastritis, and chronic appendicitis when the obstructed kidney is the offender.

Pain, when present in hydronephrosis, is not specifically characteristic and may simulate essentially the same pattern as that of any renal disorder. Possibly the most frequent pain syndrome is a dull aching sensation at the costovertebral angle which is at times intensified in the loin area. Pain in the general abdominal area, in some instances continuous lower quadrant distress, and annoying backache may be other indications of hydronephrosis. Some patients describe intermittent attacks of severe colicky pain in the renal area. There may be a history of one attack or many, beginning as a relatively sharp pain in the costovertebral angle and radiating along the course of the ureter; the pain suggests the possibility of ureteral calculus. It is more apt to be felt posteriorly over the iliocostal space and to radiate in a less typical manner than is the colicky pain due to renal and ureteral calculi.

Occasionally there will be a history of a mass which disappears after an attack of pain.[2] At times a distinct mass may be palpated in the upper abdomen in the presence of a large hydronephrosis. In ptosis of the kidney or ectopic kidney a tumor may be palpable elsewhere in the abdominal cavity and must be differentiated from intraperitoneal tumors.

If infection is superimposed on hydronephrosis there may be definite pyuria.[2] Here again the physician must be on the alert, for it is possible to perform repeated urinalyses in which pus cells are not present,

and this may result in disregarding possible kidney disease.

Patients with infected hydronephrosis may present a definite rise in temperature, chills, tenderness, and such evidence of general toxemia as would be seen in any infection. Hematuria may at times be the only symptom suggesting hydronephrosis; it is usually intermittent and results from congestion of the renal capillaries; there may sometimes be massive hemorrhage within the hydronephrotic sac due to erosion of a larger vessel. Hematuria in hydronephrosis is seldom the persistent type seen in so many other renal conditions. It most commonly accompanies, or follows, the pain of the recurrent attacks of acute blocking.

I repeat, for emphasis, that even in extreme cases of hydronephrosis it is possible for the patient to have symptoms so vague and unrelated as to mislead the physician. Symptoms of kidney disease mimic the symptoms of many other disorders, such as those of the gallbladder, gastrointestinal tract, ovaries, and uterus, and it is only by careful study and elimination that a proper diagnosis may be made.

DIAGNOSIS

Recognition of the clinical symptoms is the most important factor leading to a diagnosis of hydronephrosis, for it is possible to establish definitely the presence of hydronephrosis by pyelography. If ureteral occlusion prevents catheterization, intravenous pyelography should be done. In many cases both methods of pyelography should be employed for a complete evaluation of the extent of involvement. Diagnosis of hydronephrosis requires consideration of the entire urinary tract. Urologic examination should be accomplished in the routine manner, using all available studies, in order to determine whether involvement is unilateral or bilateral and to attempt to ascertain the underlying causes. Retrograde survey is preferred since visualization is more nearly perfect, and it is more likely to reveal the probable type of mechanical obstruction.

TREATMENT

Successful treatment of hydronephrosis depends upon accurate diagnosis of the cause or causes of the obstruction interfering with adequate drainage. Only by complete relief of urinary stasis can satisfactory results be obtained.[5] It is necessary to know if the condition is bilateral or unilateral, if complicated by long standing infection, if functional tests and pyelograms indicate there is very little secreting tissue present, and finally if the character of the obstruction permits its elimination.[1]

In bilateral hydronephrosis, if the obstruction is in the lower urinary tract every effort should be made to remove the obstruction before directing treatment to the upper urinary tract.[2] It has been repeatedly demonstrated that following removal of lower urinary tract obstruction, the upper urinary tract, in which cure had seemed hopeless, has been able to resume relatively normal function.

The physician must make the choice between surgical and cystoscopic methods of treatment.[5] In symptom-producing hydronephrosis when cystoscopic methods of treatment are ineffective or nonapplicable and when the operative risk is not too great, surgical treatment is indicated. Occasionally pyelographic studies reveal moderate dilatation of the renal pelvis without symptoms or evidence of impaired renal function. There is little chance of operative improvement in such kidneys. Occasional ureteral dilatation with renal pelvic lavage should be done with periodic pyelographic re-examination until it is established that the condition is not progressive.

In cases of advanced bilateral hydronephrosis in which surgery is contraindicated, some degree of success has been obtained by cystoscopic treatment. Dilatation of the ureters and subsequent drainage of the kidneys at rather regular intervals has proved valuable in maintaining relatively good health for the patient and keeping infection at a minimum. This is in no way to be construed as a corrective measure, for at best the prognosis is poor with only a small percentage of functioning renal tissue remaining. Such patients, under treatment, have lived comparatively normal lives, gained weight, and, for the most part, been without symptoms.

When hydronephrosis is due to ureteropelvic obstruction, the choice between conservative operation and removal of the kidney depends chiefly upon the following: (1) functional value of the hydronephrotic kidney, (2) condition of the opposite kidney, (3) the presence and severity of infection, and (4) age of the patient.[5]

The size of the hydronephrosis is not nearly so important as the functional value of the kidney.[5] A large hydronephrosis in which kidney function is good and which is free from infection may be treated successfully by plastic procedures, while a much smaller one in the presence of renal infection and atrophy will usually progress to complete destruction of the kidney regardless of treatment. In some cases of early hydronephrosis best results can be obtained by nephropexy, liberation of adhesions about the renal pelvis and upper ureter, or division of an aberrant vessel.

Accompanying infection has a decided influence on the surgical treatment of hydronephrosis.[5] If the infection is due to colon bacilli and is limited to a few pus cells, and if there are no noticeable renal inflammatory changes, there is a reasonable chance for success of plastic operations for the correction of hydronephrosis.

The probability of relief by conservative methods is greatly diminished when hydronephrosis is accompanied by well-recognized pyelonephritis.[5] The infection should be brought well under control before any effort is made to correct obstruction when one kidney or bilateral disease requires conservative treatment. Continuous catheter drainage and administration of urinary antiseptics quite often effectively eliminate infection if the renal parenchyma is not too greatly involved. When the infection is an old one, the urine very cloudy, and kidney function greatly impaired, preliminary nephrostomy may be necessary. Drainage with irrigation of the kidney and administration of urinary antiseptics should continue until the urine is clear and maximum function is obtained before plastic restoration is attempted.

The age of the patient is an important factor in determining the surgical procedure to be employed. It is proper practice to use greater conservatism in children and in young adults whose recuperative power is at its height and in whom the conservation of renal tissue is of the greatest importance. In elderly patients operation is rarely necessary for hydronephrosis. When an operation must be done because of pain or infection, if the kidney can be spared nephrectomy should be performed; otherwise, nephrostomy is usually preferred.[5]

In determining the type of treatment to be employed it is well for the physician to remember that two kidneys supply twice the filtering area of one kidney, and conservation of renal tissue is of the utmost

importance. This is the case whether treatment is medical or surgical, and if operation is decided upon, all possible efforts should be made to restore the kidney to some degree of normalcy by one of the plastic procedures.

SUMMARY

Hydronephrosis implies destruction of kidney tissue through atrophy. In most cases hydronephrosis is due to obstruction at some point in the urinary tract. The obstruction may be congenital or acquired. The most important factor leading to the diagnosis of hydronephrosis is the recognition of clinical symptoms. Symptoms of hydronephrosis are not always referable to the urinary tract, and, in many cases, simulate symptoms of intraperitoneal conditions. Many abdominal operations would not be performed if routine pyelography were required before surgery. Diagnosis of hydronephrosis can be well established with functional tests and pyelography. The first step in the treatment of hydronephrosis is to make every effort to remove the obstruction, after which therapy is directed to restoration of as nearly normal kidney function as is possible. This may mean palliative measures or surgical intervention, but the yardstick at all times is conservation of renal tissue.

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Recent Advances in Urologic Diagnostic Procedures

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TRANSLUMBAR AORTOGRAPHY

From the increased number of aortograms taken since 1947, it is apparent that translumbar aortography is becoming an accepted procedure and that it has provided the urologist with a diagnostic technic of recognized value for the investigation of pathologic conditions of the retroperitoneum and kidneys and of the aorta and its branches.

Indications and Contraindications.—

Translumbar aortography is indicated:

1. When standard procedures, such as excretory urography, retrograde pyelography, and extraperitoneal pneumography, yield inconclusive information
2. To demonstrate aberrant vessels of the normally located kidney
3. To demonstrate anomalous vessels of the abnormally located kidney
4. To evaluate the renal blood supply and detect the type of a renal mass seen at arteriography and nephrography when the type is undetectable by other means because of ureteral obstruction and a nonfunctioning kidney
5. To demonstrate that the potential function of a kidney is in direct relationship to the quantity of the blood supply to that organ
6. To demonstrate avascularity of a renal area containing a space-occupying lesion, as an indication of cyst
7. If laking, puddling, and pooling of a contrast medium has occurred in the area of a renal space-occupying lesion
8. To demonstrate renal artery and aortic obstruction, infarctions, and thrombi
9. To differentiate extrarenal and retroperitoneal tumors from renal tumors
10. To evaluate the renal blood supply of hypertensive patients
11. To demonstrate horseshoe kidney and ectopic kidney
12. To evaluate the blood supply to a hydronephrotic kidney before deciding between nephrectomy and plastic repair as the treatment of choice
13. To demonstrate aneurysm of the aorta and its branches
14. To ascertain whether heminephrectomy is indicated in certain cases of renal calculus with calycectasis
15. To determine the extent of renal vein involvement in hypernephroma before deciding upon treatment.

The contraindications to translumbar aortography are few in number, namely, idiosyncracy to iodides, inability to undergo regional or general anesthesia, and severe allergy such as asthma, cardiac failure, and uremia.

Method and Materials.—The equipment for translumbar aortography consists of a sterile tray containing two 1-ounce medicine glasses, three 10-cc. Luer-Lok syringes, an adapter for the needle, plastic tubing about 8 inches long, a stopcock, and a 6-inch, 17-gauge needle with a Huber point and stylet. The tubing is securely attached to the needle at one end and a stopcock at the other. The stopcock is attached to the syringe containing the solution to be used. Solutions to be used may be either 70 per cent Urokon or 70 per cent Neo-Iopax and sterile physiologic saline. The x-ray equipment consists of a standard x-ray table, preferably one with a 500-ma. tube and a high speed Bucky diaphragm.

Technic.—A scout film of the lower chest, abdomen, and pelvis is taken with the patient prone on the x-ray table. This film is exposed at not less than 0.1 or more than 0.2 second, developed, and inspected before aortography is undertaken. While the film is being developed, the patient is anesthetized, preferably with an intravenous anesthetic. His back is prepared by any of the standard surgical scrub procedures, and the left lumbar area is draped with sterile towels. Under aseptic technic, one 10-cc. syringe is filled with 12 cc. of the

dye. Another 10-cc. syringe is filled with 4 cc. of the dye. The third 10-cc. syringe is filled with physiologic saline. The needle, with its stylet intact, is inserted at the lower edge of the twelfth rib, 8 cm. to the left of the spinous process. The needle is passed superiorly, ventrally, and medially to the body of the twelfth thoracic vertebra and then is advanced slowly and methodically ventrally along the body of the vertebra until the point has passed just under the left edge of the vertebra proper. The stylet is then removed and the needle advanced 0.5 to 1 cm. where it should encounter and enter the aorta.

When the needle has entered the aorta, as evidenced by a rather brisk flow of blood, the lock which is on the shaft of the needle is brought in contact with the skin and secured. The plastic tubing is attached to the needle and the stopcock closed. The syringe containing the saline is attached, the stopcock opened, and a few cubic centimeters of the saline injected, principally to clear the lumen of the needle. This syringe is detached after closing the stopcock, and the syringe containing 4 cc. of contrast media is attached. The x-ray technician is properly instructed, the 4 cc. of the media are injected into the aorta with force, and the film is exposed immediately upon completion of the injection. While this film is being developed, the syringe containing the normal saline is attached to the tubing and saline is slowly injected. This injection of the contrast medium is for the sole purpose of establishing whether the tip of the needle is in the proper position in the aorta. Should the exposed film show that the solution is entering the mesenteric artery or the splenic artery, little harm has been done with this amount of solution, and the needle may then be manipulated into its proper position.

With the needle properly positioned, the syringe with the saline is disconnected and, in its place, the syringe containing the 12 cc. of the contrast medium is connected. The entire solution is injected within 4 seconds, and the film immediately exposed. Following this the needle is removed, and the patient returned to the ward.

PRESACRAL RETRORECTAL EXTRAPERITONEAL PNEUMOGRAPHY

The injection of air or oxygen into Gerota's capsule after puncture through the loin in order to enhance the radiologic image of the kidneys was first described by Rosenstein,[1] Carelli,[2] and Sordelli[3] in 1921. Because of the danger of gas embolism, particularly in vascular and necrotic areas, and because of the technical difficulties associated with various abnormal positions of the kidneys, the initial popularity diminished. Interest was revived in 1950 when Ruiz Rivas[4] developed a technic whereby a bilateral pneumogram could be obtained through a single puncture into a practically bloodless area.

Perirenal pneumography is indicated where pyelography may not be conclusive and in suspected tumors of retroperitoneal, renal, or suprarenal origin.

Technic.—

The position of the patient after he has been properly prepared depends on whether unilateral or bilateral pneumography is to be performed. For unilateral pneumography, the patient is placed in the lateral position with the side to undergo sufflation in the uppermost position. The knees are drawn up, and the anus is anesthetized with an ointment containing an anesthetic base. The area between the coccyx and anus is cleansed and an aqueous antiseptic applied. Two per cent procaine solution is injected in the midline between the anus and coccyx. A no. 18 spinal needle is inserted through the previously anesthetized area until the tip of the needle reaches the tip of the coccyx. The index finger of the free hand is inserted into the rectum, and the needle is directed along the anterolateral border of the sacrum and then upward between the sacrum and rectum until the point lies well within the sacral hollow. If bilateral pneumography is indicated, a midline puncture is made through the anococcygeal raphe and the needle advanced 2 to 3 cm. beyond this point.

A few cubic centimeters of air are injected to check the position of the needle and to ascertain that it is correctly placed. To the hub of the needle is attached a 50 cc. Luer-Lok syringe with a two-way stopcock. Tubing leads from one arm of the stopcock to the oxygen tank. Washed oxygen is then run into the syringe, and when the syringe is filled the oxygen is injected through the needle. This procedure is repeated until 400 to 500 cc. of oxygen have been introduced into the retroperitoneal space for unilateral pneumography and up to 1,000 cc. for bilateral pneumography.

The patient is instructed to sit up for several minutes after the needle has been removed and then is placed on the x-ray table. The patient's position may be changed at any time so that the oxygen will reach the desired location. If necessary, retrograde pyelography may be done following this procedure and simultaneous pyelograms and pneumograms can be obtained.

PERINEAL PUNCH BIOPSY

Early recognition of prostatic carcinoma and, while it is still localized, radical removal either by the perineal or retropubic route are at the present time accepted by most authorities as the only means of eradication.

The typical patient with lower urogenital tract complaints and in whom a hard, fixed, irregular, indurated prostate is palpated during rectal examination offers no particular diagnostic problem, but he is in all probability beyond the hope of cure by any available therapy at this time.

There appears to be very little disagreement among urologists that biopsy should be performed on any suspicious nodule or induration in the prostate. The difference in opinion seems to be over what method will provide early recognition of the highest percentage of pathologic processes. It is common knowledge that the majority of urologists do not practice open perineal biopsy because of its two major disadvantages as a routine procedure. First is the fact that when open perineal biopsy is accomplished, the surgeon is prepared for total enucleation if the frozen section is reported malignant, but it is well recognized that frozen sections do not always provide reliable information. Second, if the tissue is reported to be benign, and if the patient's complaints are few, the prostate not unduly enlarged, and there is no true indication for enucleation, the patient has been subjected to a rather severe and unnecessary diagnostic procedure that could have been accomplished by a less radical approach.

Because of the apparent disadvantages of routine open perineal biopsy, punch biopsy of suspicious prostatic nodules palpated rectally and of any area that is fixed or hard in or around the prostate appears to be a more logical and less mutilating procedure.

Technic.—

There are several biopsy punch instruments on the

(Continued on page 457)

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SURGICAL ISSUE—II

This, the second Surgical Issue of THE JOURNAL, presents papers from the Twenty-Seventh Annual Clinical Assembly of the American College of Osteopathic Surgeons held in Dallas, Texas, from October 31 to November 4, 1954. The quantity and high quality of the papers prepared for the Clinical Assembly these last 2 years have made it necessary to devote an entire issue to them. The subject matter of these articles is such that they are of interest and value to all osteopathic physicians, whether they are engaged in general practice or in specialized practice in fields other than surgery.

Dr. J. Donald Sheets, Detroit, president-elect of the College, was program chairman for the meeting from which the papers originated.

The Editorial Committee is as follows: Dr. Don E. Ranney, Detroit, chairman; and Drs. Leo R. Conley, Columbus, Ohio, Paul R. Koogler, Kirksville, Missouri, K. George Tomajan, Boston, and John P. Wood, Birmingham, Michigan. The efforts of the chairman, which have been largely responsible for the Surgical Issues, demonstrate how effective such a position can become in furthering education of osteopathic physicians and contributing to the scientific publication of the American Osteopathic Association.

Dr. James M. Eaton, Philadelphia, presided at the Dallas meeting. The officers for 1955 are: Dr. J. Willoughby Howe, Hollywood, California, president; Dr. Lucius B. Faires, Hollywood, California, vice president; and Dr. Charles L. Ballinger, Toledo, Ohio, secretary-treasurer.

The Twenty-Eighth Annual Clinical Assembly will be held in Washington, D.C., October 30 to November 3.

VI—RESEARCH AND EDUCATION IN OSTEOPATHY

This editorial is the sixth in a series on the Cole thesis on research and education in osteopathy.[1] *The series offers an opportunity to* JOURNAL *readers to become acquainted with that aspect of osteopathic history which is presented objectively and authentically by the thesis, and especially to those who would have neither the time nor opportunity to study in its entirety the original document. An editorial discussion of the entire thesis and its relation to living osteopathic history is reserved for the April* JOURNAL.

The February editorial study of the Cole thesis covered in part its fourth and final period, the one entitled "Research and Education to the Present, 1944-1954." This is the period in which the osteopathic profession became acutely aware of the necessity for financial support of its colleges, responding in a manner unprecedented in any profession by furnishing the money necessary for their reorganization and improvement. This period was also shown to be one in which the profession's research policy was revised, redirected, and correlated. Most important of all, it was given the scientific freedom necessary for creative production in any type of research. A second important redirection of research policy resulted in the centralization and coordination of the profession's research activities within a newly created (1952) bureau of the American Osteopathic Association, the Bureau of Research.

A first result of the new policy was the subsidization of investigators in one of the approved osteopathic colleges, with the expense of the research program borne both by the college and the American Osteopathic Association—a successful innovation which integrated the activities of research programs with teaching by the investigators.

The Cole thesis establishes the fact that from 1945 to 1954 osteopathic research was characterized by programs sharply directed toward a study of the relationship between the osteopathic concept and the central and peripheral nervous systems. Emphasis on the role of the nervous system in the evaluation of the osteopathic concept was not new; rather the relationship was seen as one which could result in new and unforeseen approaches to urgent and universal health problems.

In 1947 the first federal grant was made to an osteopathic research program proposed at the Kirksville College of Osteopathy and Surgery. This was the first recognition by a nonosteopathic fund-granting agency that the profession's program was of such significance to medical sciences as to warrant government support.

In 1950 the government enlarged the scope of its aid to osteopathic education through cancer teaching grants to the six colleges, followed shortly by similar teaching grants in cardiovascular diseases.

The entire fourth period of osteopathic research

1. Cole, W. V.: The development of osteopathic research and education. Thesis submitted in partial fulfillment of the requirements for the degree of Master of Arts, Northeast Missouri State Teachers College, Kirksville, Mo.

and education as set forth by the Cole study of source documents has been characterized by a growing maturity of reason and increased emphasis upon scientific methods. Successful attempts were made to relate osteopathic procedure to advanced neurophysiologic phenomena rather than only to theoretical physiology. There was frank recognition by leaders responsible for the research program that programs hitherto attempted (prior to 1944) had not acceptably established the rationale of the osteopathic concept. Many members of the profession, convinced of the efficacy of manipulative therapy in diseased conditions, remained entirely unacquainted with the breadth of osteopathic principles applied to medical advance, or unconvinced of the potentiality that modern osteopathic research holds for the reorientation of all of medicine.

Cole points to the period between 1947 and 1950 as one in which "attention was again directed toward the central and peripheral nervous system and its relationship to the osteopathic concept . . . . some actual investigations were conducted to ascertain the effects of the experimental 'osteopathic lesions,' and this was followed by a review which attempted to explain the neurophysiological phenomena associated with areas of spinal dysfunction." (This review by Cole himself is a thesis presented in 1952 to the American College of Neuropsychiatry and is unpublished.)

The reviews and reports which appeared from 1947 to 1950 offered experimental evidence as a part of the basis for osteopathy. Cole suggests that an important motivation for such studies was an

> . . . attempt to correlate the osteopathic concept with those theories of neurophysiological phenomena that were accepted by science in general. The object of such reviews was to discount any suggestions that the osteopathic approach to disease, its theories and disciplines, was in any way antagonistic to well-established biological reactions.

He cites an early report of Irwin M. Korr,[2] as an example of a report in which certain general reactions of the central nervous system were associated with the osteopathic lesion and were so explained.

Cole questions the possibility of attempting to evaluate past osteopathic research as equated by present standards. He points out that:

> "In many cases exact measurements are impossible in biological systems in spite of the great advances in technical methods during the last decade."

He emphasizes:

> The failure to obtain measurable exact reactions does not eliminate the usefulness of scientific observations, similar to the work done by Dr. Burns and her co-workers. Furthermore, because there is not complete agreement of the conclusions of a single investigator by others it should not be concluded that the entire investigation has been invalidated. The results of the investigations of one researcher become, many times, the building blocks of those that follow in such a manner that they are useful.

The remaining years of the fourth period were seen by Cole as motivated by its early objective—and yet characterized by a "gradual but general expansion" of research programs. He cites one exception to the research activities of the period—a study of the physics of the intervertebral disc. It is a new approach to spinal mechanics in an attempt to ascertain information which is related directly to the forces and mechanics of the spinal column which affect its functioning. The research team for this project is made up of an osteopathic physician and a group of research physicists. As a scientific investigator concerned primarily with a biologic approach to phenomena Cole suggests that there is danger in "the application of a physical-mathematical evaluation of a biological system with its inherent variations." The project is being sustained through grants from the Foundation for Research (an agency of the New York Academy of Osteopathy—incorporated in 1952—which is a constituent body of the Academy of Applied Osteopathy, in turn an affiliated body of the American Osteopathic Association) and a contributing grant from the Bureau of Research of the A.O.A.

The author draws certain definite conclusions from his study of osteopathic research and education and of the profession itself as they cover a span from 1896 to 1954. He believes that the evidence presented of progress in standards is such as to warrant a favorable comparison with the progress made in scientific standards generally. He points out that most of this advancement has resulted from the efforts of the profession itself, although he gives due credit to the recent assistance of federal agencies in both osteopathic education and research.

Cole ascribes failure of osteopathy to be entirely received as a discipline to two factors—lack of a precise definition of the osteopathic concept per se which would be accepted both within and without the profession and the question of the worth of osteopathic education as medical education.

To validate this point, Cole again refers to the historic and authoritative Flexner report (1910) as being "extremely critical of the manner in which the osteopathic concept was presented to osteopathic students, but not of the concept itself."

Cole does not see manipulative therapy per se as a part of the problem of the general acceptance of the osteopathic concept, since manipulation acknowledgedly has a definite place in pathologies involving sprained muscles and joints. The problem, as he sees it, is the "manner in which the osteopathic concept can be presented as a part of general disease syndromes." He suggests that the actual relationship involved can be "substantiated only by the results of osteopathic research, and distributed by means of osteopathic education."

This investigation has enabled its investigator to trace the growth and development of the osteopathic profession in the light of osteopathic research and education, an influence which he rates as considerable—at the most, a conservative estimate. Certainly, Cole has established the historical concomitancy of research and education in osteopathy, thus fulfilling the purpose back of the writing of the thesis. The parallelism between these two components is revealed by the investigator's study of contemporary documents. For an in-

2. Korr, I. M.: The neural basis of the osteopathic lesion. J. Am. Osteop. A. 47:191-198, Dec. 1947.

terpretation of the relation between research and education he turns to Alan Gregg:

> Research is fundamentally a state of mind involving continual re-examination of the doctrines and axioms upon which current thought and action are based. . . . Many colleges and universities are now important centers of research that made little provision for it twenty-five years ago. . . . It is only within recent times that this has changed and universities in this country have come to recognize that research is as important a part of the work of the university as teaching, and that both go forward together in order that education and information may properly advance.

This interpretation is fundamentally true of the growth and development of osteopathy.

"Research and Education in Osteopathy" is concluded by a brief chapter entitled "Summary and Conclusions," which restates the purpose of the thesis: to describe the development of osteopathic research and its relationship to osteopathic education. A list of more than 140 carefully selected references in itself is a collocation valuable to future historians of osteopathic history.

ADVANCES IN THE FIELD OF CARDIOVASCULAR DISEASES

During the past several years many outstanding advances have been made and new concepts developed which have contributed richly to the reservoir of knowledge in the field of cardiovascular diseases. Physicians and other scientific workers throughout the world, although separated by large geographic areas, are working closely on mutual problems to solve many of the enigmas of diagnosis and treatment. This was reflected at the September, 1954, meeting of the Second World Congress of Cardiology which was held in Washington, D.C. Many nationalities and languages were represented, but the single purpose of seeking and disseminating knowledge unified the heterogeneous group.

It would be difficult to summarize the most important contributions made during the past few years. The work of Gofman and others in establishing a direct relationship between the lipoprotein concentrations in the blood and atherogenesis has been of outstanding significance. Recent work with lower animals has indicated that atherogenesis is a reversible process and that estrogen and heparin are capable of reducing abnormally high concentrations of lipoproteins to a normal level. Research in this field with the use of ultrahigh centrifuge is being done in institutions throughout this country which may provide a solution to one of the greatest problems of modern civilization and even ultimately have therapeutic implications which may affect the longevity of the human race.

Radioactive substances have been found to have practical value in the thyrocardiac patient. Radioactive iodine has been used with great success in this field and, as knowledge is gained in this new area, further applications will undoubtedly be developed.

The field of cardiac surgery has been directed toward the management of both congenital and acquired heart disease. Dramatic results are being obtained with mitral stenosis, aortic stenosis, and aortic regurgitation. The success of surgical treatment of patent ductus arteriosus and tetralogy of Fallot has challenged surgical imagination and prompted more heroic approaches in other formidable congenital disorders. Success has been achieved by Brock in England and others in the United States in the surgical management of primary pulmonary stenosis. The treatment of ventricular septal defects with surgery will probably become a more common procedure during the next few years with improved surgical technics and more refined methods of anesthesiology. Ligation of the inferior vena cava has been successfully employed in heart failure. Beck's operations in coronary artery disease for the establishment of collateral circulation by production of an aortic-coronary sinus fistula or scarification of the pericardium with asbestos have already proved successful. Rapid advances in cardiac surgery foreshadow a new type of cardiologist for the future. It is not unreasonable to expect that he will be trained to manage cardiovascular problems from a more unified standpoint—as both surgeon and internist.

Hypertension is now more rationally managed with the addition of the newer drugs to the physician's armamentarium. Treatment is more physiologic with the use of the adrenergic-blocking agents and other drugs which act upon the autonomic and central nervous systems.

Anticoagulants have definitely decreased the mortality and morbidity in myocardial infarction. This has been substantiated by the recent reports of an extensive study made by the American Heart Association over a period of several years. In this disease, treatment of shock with norepinephrine has also contributed to the decreased mortality rate during the first 24 hours to 48 hours following intarction.

With a better understanding of cardiac disease a new field, sometimes called occupational and rehabilitation cardiology, has been developed. Its accomplishments have enabled the cardiac patient to return to industry, the trades, and the professions to gain a livelihood for himself and his family. This is a very important contribution and will continue to develop with more mature understanding of the cardiovascular problems.

Rheumatic fever has always presented a great problem and has been responsible for producing serious cardiac disease in childhood and adult life. The advent of antibiotics has established a rational approach for its prevention. As a result of long and tedious efforts, active rheumatic fever has become less of a threat to youth and may in time be completely eliminated. Efforts are still being made to determine the etiology of this disease. At the recent meeting in Washington, evidence was presented which strongly implicated the enzyme streptococcic proteinase, a potent cardiotoxin and a product of group A streptococci, as the cause of the cardiac changes that follow streptococcic infection in man.

Some of the significant advances made in the field of cardiology have been in the area of diagnosis. Greater stress is now being placed on spatial vectorcardiography as well as on conventional electrocardiography. Ballistocardiography is being done with

greater frequency and has contributed additional knowledge to the understanding of the physiology of hemadynamics.

Cardiac catheterization and angiocardiography are important procedures which have enabled surgeons to explore the heart. These studies allow more definitive preoperative diagnoses than were formerly possible.

One of the really great developments during the past few years has been cardiac resuscitation. Pioneers in this field, such as Beck, have contributed much to the understanding of the underlying physiologic processes which is vital to the management of the patient with cardiac arrest or ventricular fibrillation. A defibrillator has been developed which can be used directly on the exposed heart. When defibrillation has been accomplished normal sinus rhythm can be re-established by manual compression of the heart and chemotherapeutic methods. Recently an external cardiac pacemaker was devised; idioventricular rhythm can be initiated in cardiac arrest by applying electrodes directly to the chest and electrically stimulating the heart. This is carried out until the heart is capable of instituting its own intrinsic rhythm. This remarkable method has made resuscitation possible without entering the thoracic cage. It has also been used successfully in Stokes-Adams syndrome; without its use death due to prolonged asystole would have occurred.

It is recognized that heart disease is one of the more formidable problems of the day. Large sums of money are being channeled to develop knowledge and to expand understanding of the prevention and treatment of the major cardiac problems. The outlook for the future is good. If the advances made during the next 5 years are as successful as those during the previous few years, a very significant decrease in mortality and morbidity can be expected which will further increase the life span of the average individual.

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Notes and Comments

REGISTER OF TRAINING PROGRAMS

The 1955 edition of the "Register of Training Programs" of the American College of Osteopathic Surgeons has been widely distributed recently to members and candidates of the College, osteopathic hospital administrators, and osteopathic physicians interested in preceptorship training. The brochure contains specific information on the purpose and policy of the training programs in various fields of surgery, all of which are under the jurisdiction of the College. This program was first established in 1950 and meets the requirements of all the agencies of the American Osteopathic Association which have to do with programs leading to eventual certification in the various specialty fields. The brochure is attractively designed for easy reading, although the information it contains covers any questions that could arise in the reader's mind—in fact, it does that by actually asking and answering ten pertinent questions.

Fields Covered.—

The brochure contains information on preceptorship training programs in the fields of surgery, including the specialty fields of neurosurgery, obstetric-gynecologic surgery, orthopedic surgery, peripheral vascular surgery, plastic surgery, urologic surgery, and anesthesiology. All osteopathic physicians interested in some phase of the training program should study the brochure carefully and file it for reference. Inquiries and specific questions about preceptorship training programs (or requests for the brochure) should be addressed to:

Dr. Orel F. Martin, Secretary, Evaluating Committee

P.O. Box 474, Coral Gables, Florida

Road to Specialization.—

Specialization in osteopathic medicine is a professional development covering several decades of normal growth. There are many osteopathic physicians who are not acquainted with the basic requirements, although everyone should know them if for no other reason than to inform interested laymen. These requirements are:

1. The doctor of osteopathy who wishes to become a certified specialist in some specialty field of osteopathic medicine must complete a minimum of 5 years of postgraduate study in addition to an approved internship of 1 year in an osteopathic hospital.

2. Three years of the 5-year period shall include a 3-year approved residency in an osteopathic hospital, an approved preceptorship or assistantship (see Register of Training Programs above), or a combination of the two.

3. Two years of specialty practice.

4. An oral, written, and practical examination given by one of the certifying boards established by the American Osteopathic Association—providing that the particular board finds the applicant qualifies in every detail of its requirements for entrance to the examination.

5. Submission of the specialist's entire record of qualification to the Advisory Board for Osteopathic Specialists, the membership of which is made up of representatives from the various qualifying, approving, and accrediting agencies of the osteopathic profession.

6. Final approval of the osteopathic physician for certification in the field of his study by the profession's certifying agency, the Board of Trustees of the American Osteopathic Association.

End of the Road.—

Completion of the training program results in competency in a given field. The act of certification is a guarantee to the profession and the public that the physician is what is known popularly as a "board" man, that is, he is what he purports to be. It is an established record that a round of study covering 17 years after the individual has completed his elementary school program has come into full cycle. A physician (D.O.) may hold certification in one specialty field only. Full details on the specialty programs of the American Osteopathic Association will be found in the February, 1955, issue of THE JOURNAL, on pages 382-402. This issue should be filed for reference, as such information is only published annually.

Comprehensive Medicine.—

This recountal of the program and methods of specialization in osteopathic medicine should in no way be considered as emphasis upon a superior kind of program merely because of the aura that still lingers around specialization, although it is a fading one. Specialty programs are good programs which, when completed, can be a rightful source of pride to those who are intrigued by special skills and technics. General practice in osteopathic medicine, however, is a challenge sufficient to command the lifetime effort of any young osteopathic physician. It is a special challenge to fit the osteopathic approach into the broad program of the oldest field of medicine. The fault with general practice in the past was not with the field; it was with the individual who failed to see its comprehensiveness and who did not recognize that, at its best, every specialty is a fractionation of medicine.

Specialization in osteopathic medicine is obligatory upon a profession that has set out to render a complete medical care to a definite sector of the American people. But the future of the profession and the distinctive contribution which it has to make to the health of the American people rests with the doctors of osteopathy generally.

In Briefer Form.—

The addition of antihistaminic agents to penicillin did not much reduce the danger of the severity of reactions to the antibiotic, according to reports recently presented at the eleventh annual meeting of the American Academy of Allergy at the Statler Hotel, New York City. . . . At the same meeting, Dr. Homer E. Prince of Houston, Texas, president of the American College of Allergists, addressed the Academy, suggesting a specialty board for certification of specialists in allergy. In old-school medicine allergy specialists are either internists or pediatricians who have selected allergy as a sub-specialty. . . . Dr. Prince estimates that 15 million people in America have an allergy problem of one type or another. He believes that not more than 1,500 doctors treat allergies, and of these only 200 are specialists in internal medicine or pediatrics who sub-specialize in allergy. . . . An interesting question considered by the Academy was whether or not a true form of allergy may be produced by smoking or does it merely act as an irritant? One report suggests that although its incidence is low, there is a true atopy to smoking. . . . The latest drug to be reported as worthy of study for the treatment of pulmonary tuberculosis is a broad spectrum antibiotic cycloserine. VA hospitals will give it a controlled 6-month study. Clinical tests thus far suggest that the antibiotic may prove as effective as the agents now in use which include streptomycin, isoniazid, and PAS (para-amino-salicylic acid). . . . Evidence that the newer methods of treatment of tuberculosis are effective to a practical degree is shown by the closing in New York City of three of its older tuberculosis hospitals. Capacity of the three institutions totalled more than 1,000 beds with an operating cost of more than 2½ million a year to the city. The Hospital Department of NYC is reported by *The New York Times* as giving credit for the improvement of the tuberculosis problem to the availability of the newer drugs (aside from cycloserine). . . . The closing of the Trudeau Sanatorium, Saranac Lake, N.Y., on December 1, 1954, is additional evidence of the slow but sure conquering of tuberculosis. When Dr. Trudeau died in 1915 at the age of 68 the tuberculosis mortality in the United States was 140 deaths for each 100,000 population. In 1953, it had dropped to 12.6. But tuberculosis is far from under control. . . . Edward Livingstone Trudeau united the art of medicine with its science in such a way as to make him the true physician. His philosophy of practice remains as an ideal for any physician in any time: "To cure sometimes, to relieve often, to console always."

GREENBURG—RECENT ADVANCES IN UROLOGIC DIAGNOSTIC PROCEDURES

(Continued from page 452)

market, and they all have their advocates. At the present time I use the Veenema modification of the Gusberg endocervical biopsy punch. The tip of this instrument is 1.5 cm. in length and has biopsy cups 0.5 cm. in diameter. Clean bites of tissue averaging 0.3 to 0.4 cm. in diameter can be obtained.

The procedure is not complicated or difficult. A general, caudal, or local anesthetic is administered, and the patient is placed in the lithotomy position on the examining table. The perineum and genitalia are prepared as for any perineal procedure and sterile drapes applied, leaving both the perineum and genitalia exposed. The index finger of the well-lubricated gloved hand is inserted into the rectum and the suspicious area located. A stab incision is then made in the perineal skin either to the left or right of the midline, depending on the location of the suspicious area. The tip of the biopsy instrument is then inserted through the incision with the other hand. The biopsy cups must be kept closed until the area to be biopsied has been encountered. The tip of the instrument is guided by the finger in the rectum, being kept close to the rectal wall to avoid the vascular penile bulb. When the tip of the instrument has approached the suspected area, the biopsy cups are opened with the thumb and index finger; the nodule is pressed closer to the tip of the instrument and, as the hilt is depressed, the tip is pushed

into the prostatic tissue. The cups are closed and the punch is withdrawn with the cups remaining closed. Bleeding, if any, is usually controlled by perineal pressure, and the skin incision is closed with a suture.

PROSTATIC AND PERIPROSTATIC PHLEBOGRAPHY

The first successful radiographic demonstration of the periprostatic and deep pelvic veins in vivo was performed in 1950 by Ciccarelli.[5] Later Abeshouse and Ruben[6] perfected a technic which I shall outline briefly.

Materials required are a no. 20-gauge needle, 1½ inches in length, two 20 cc. glass Luer-Lok syringes, one three-way stopcock, 500 cc. of intravenous saline, tubing, a tourniquet, and 25 cc. of Urokon, 70 per cent solution.

After the penis is prepared with an antiseptic solution, a tourniquet is applied at its base in order to produce distention of the deep dorsal vein. The vein is entered with the needle, the hub of which is attached to the three-way stopcock. One limb of the stopcock is connected to the saline solution and the other limb to a 20 cc. syringe. The saline is allowed to run through the needle to assure that it is properly placed. The saline solution is shut off, and 10 cc. of 70 per cent Urokon are injected into the dorsal vein. Films are taken with a short exposure and with the x-ray tube coned down at 42 inches and angled 5 degrees toward the patient's head.

The indications for prostatic and periprostatic phlebography are (1) prostatic malignancy, (2) occlusive diseases of the pelvic vein, (3) priapism, and (4) tuberculosis.

BLADDER ELECTROMYOGRAPHY

The cystometrogram as a means of recording bladder function has been proved to be of limited aid, but it has served its purpose by stimulating further research into the subject of bladder physiology.

Boyce[7] has initiated and is continuing studies and experiments in bladder electromyography and so far has proved that muscular activity of the human bladder is preceded and accompanied by electropotential changes which can be translated into characteristic wave forms by a suitable technic. They suggest that further work along this line may result in a valuable addition to the diagnostic armamentarium of the urologist.

URETHROCYSTOGRAPHY

The evaluation of the prostate, prostatic urethra, and bladder base is very important from the standpoint of diagnosis and prognosis. A water-soluble contrast medium such as Skiodan is injected into the urethra and bladder, and x-rays are taken during injection and during micturition. Enlargement of the prostate, vesical neck contracture, deviations in the prostatic urethra, false passages, diverticula, the state of the bladder, and evaluation of the urethra following enucleation of the prostate or its electrosurgical removal may be evaluated with this technic.

DORSAL CYSTOGRAPHY

Dorsal cystography is of immense value in facilitating the study of the posterior portion of the bladder, the retrovesical portion of the ureters, and the region in proximity to the trigone.

The patient's position for this exposure was first suggested by Chassard and Lapine[8] as a method of obtaining measurements of the female pelvis and recently by Raap[9] as a method for roentgenographic demonstration of the rectum and colon.

The method to be described is the modification of the Chassard-Lapiné technic devised by Boyce, Harris, and Vest.[10]

The bladder is filled with 200 to 250 cc. of 15 per cent sodium iodide. The Bucky tray which holds the cassette containing the 14 by 17-inch film is placed horizontally on the x-ray table. The patient is placed crosswise in a sitting position over the Bucky tray. He is instructed to place his feet on a low support and to lean over and grasp his ankles so that he sits over the film. The x-ray tube is adjusted directly over the center of the pelvis and a dorsal-caudal exposure made.

If pathologic deformity is noted after this film is exposed, routine anteroposterior, oblique, and lateral exposures and a voiding cystourethrogram can be made.

EVALUATION OF SIZE OF BLADDER NEOPLASMS

Evaluation by cystoscopy only of the extent of involvement of the bladder mucosa by neoplastic growths is difficult at times. Before determining the type of treatment, whether it is to be deep x-ray therapy, radon seeds, or radium, the radiologist wants to know exactly how much of the bladder is involved and the exact location of the neoplastic growth.

Because of this fact and also because there is often disagreement between urologists as to the exact size and location of the tumor and the extent of the bladder involvement, a method of localizing the growth and determining the involvement has been introduced.

Technic.—

A catheter is introduced into the bladder and all debris and blood clots which may be present are evacuated.

One and one-half ounces of Umbrathor solution are instilled into the bladder through the catheter. The catheter is clamped for exactly 3 minutes, the bladder is then filled to capacity with sterile distilled water, and the catheter is again clamped. The first exposure is taken with the patient in the supine position, following which an oblique exposure is made with the patient's pelvis at a 45-degree angle with the x-ray table.

The bladder is then emptied and irrigated until the return fluid is relatively clear. A volume of air equal to the amount of fluid instilled is then injected, following which supine and oblique exposures are made. This gives a contrast pneumocystogram.

When these different exposures are viewed, the portion of the bladder not involved by neoplastic growth will be black, while the bladder lesions will be lighter in color because the Umbrathor clings to them. This occurs regardless of the size or location of the tumor growth.

When these roentgenograms are viewed there is rarely any difference of opinion as to extent and location of the neoplasm. Therapy, whether it is conservative or radical, can then be instituted and followed through on a more scientific basis.

SUMMARY

Recent developments in urologic diagnostic procedures have been discussed. Included is a discussion of translumbar aortography, its indications, contraindications, methods and materials used, and the technic for the procedure. Presacral retrorectal extraperitoneal pneumography, perineal punch biopsy, prostatic and periprostatic phlebography, electromyography of the bladder, urethrocystography, and dorsal cystography are described. A technic for evaluating the size of neoplastic growths in the bladder is also given.

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FIFTY-FIRST ANNUAL CONGRESS ON MEDICAL EDUCATION AND LICENSURE

The Annual Congress on Medical Education and Licensure, conducted under the auspices of the Federation of State Medical Boards of the United States and the Council on Medical Education and Hospitals of the American Medical Association, was held in Chicago February 5-8, 1955. The program for these meetings specifically states that they are "open to physicians and others interested in medical education and licensure." Osteopathic physicians from seven states and the members of the American Osteopathic Association Central Office staff were in attendance at all meetings. Osteopathic members of Boards of Medical Examiners were present from Colorado, Cecil C. Thorpe and C. Robert Starks; Indiana, C. Allen Brink; New Jersey, Edwin T. Ferren; New York, John R. Pike; and Texas, Everett W. Wilson. Osteopathic members of Basic Science Boards present were Minnesota, Carl E. Morrison, and New Mexico, Lawrence C. Boatman. These meetings, in the opinion of the osteopathic physicians present, furnished an unusual opportunity for members of licensing boards and physicians interested in the education of physicians and surgeons to familiarize themselves with the latest developments in and problems of licensing and education facing the healing art professions. With few exceptions, all of the subject matter upon the agenda of the meeting, whether on the part presented by the Federation of State Medical Boards of the United States, the Council on Medical Education and Hospitals, or the American Association of Basic Science Boards, is of interest to members of the osteopathic profession, and particularly to doctors of osteopathy serving on state licensing boards, whether a board of medical examiners or a board of osteopathic examiners. Since all physicians are welcome to attend the meetings and all meetings are open, it is believed that the members of the osteopathic profession, whether especially interested in only licensing or in education, should avail themselves of the opportunity to attend. These meetings are most informative and at times provocative. It is hoped that at the next Annual Congress on Medical Education and Licensure, which will be held in Chicago in February, 1956, more members or representatives of the osteopathic profession will be in attendance. Most of the reports presented and the discussions concerning such reports are subsequently published in either the *Federation Bulletin*, published monthly by the Federation of State Medical Boards of the United States, or in the Educational Number of the *Journal of the American Medical Association*, published annually in September. Copies of some of the reports were distributed at the meetings and may be available upon request to the Central Office.

The meetings covered 4 full days; thus it is possible to make only brief comments on a few of the subjects on the agenda.

Leaders in medical education and television covered in detail the educational potential of television in postgraduate medical education, the various technics used, and the problems relating to its use.

A report of the Committee to Draft a Uniform Medical Practice Act of the Federation of State Medical Boards recommended that the Federation give approval to seven recommendations relating to basic principles or provisions which should be a part of a uniform medical practice act. The chairman of this Committee was Bruce Underwood, M.D., secretary of the Kentucky State Board of Health. His report did not attempt to propose recommendations which would be applicable to all schools of the healing arts or to graduates of medical schools outside of the United States or Canada. Therefore, it was only a partial report, which contained a suggestion that the matter of graduates of some healing art schools, including osteopathic schools, and foreign medical schools should be dealt with at a later date. The basic recommendations submitted to the Federation by this committee were not inconsistent with the educational and licensing principles given approval from time to time by the American Osteopathic Association, except insofar as the report of the committee limited its recommendations to medical schools approved by the Council on Medical Education and Hospitals of the American Medical Association. A copy of this report is available upon request. At the conclusion of the meeting the Federation appointed George R. Buck, M.D., president of the Colorado Board of Medical Examiners, to be chairman of the Committee to Draft a Uniform Medical Practice Act during the next year.

The president of the National Board of Medical Examiners appeared before the open meeting of the Federation of State Medical Boards and requested and extended cooperation to state licensing boards. The methods and procedure by which the National Board of Medical Examiners conducts its examinations and, in particular, information pertaining to the content of and procedure in regard to the multiple-question machine graded examinations now used on Parts I and II of the National Board examination was presented. It was stated that the National Board of Medical Examiners would no longer admit to its examination graduates of foreign medical schools unless requested to so do by a state medical licensing board. It was stressed that the educational testing service only advises and suggests to the National Board technics and procedures relating to the examination; it does not have any authority or jurisdiction over the content or grading of the examinations.

The problem of foreign medical graduates continues to be the subject matter of primary interest and concern to state licensing boards and to persons interested in medical education. This problem is as current today as it was 5 years ago. Under the recently enacted McCarran Act of the United States Congress, it is estimated that approximately 11,000 graduates of foreign medical colleges may come to the United States in the next several years. It is recognized and acknowledged by medical educators that the education and training in these foreign medical schools is inadequate and incomplete. Their education is lacking, in most instances, in the preprofessional area, the basic sciences, and in clinical study. At present, only two state licensing boards have established an adequate procedure for screening the qualifications and competence of these foreign graduates. Submitted, therefore, at the Federation meeting was a report by a cooperating committee on graduates of foreign medical schools recommending the establishment of a central administrative unit to examine and evaluate the cre-

dentials, education, training, and competence of graduates who seek either to be licensed in the United States or to undertake postgraduate medical education in this country. This report was published in the *Federation Bulletin,* December, 1954. The report as submitted to the Federation was approved and this program, therefore, will be implemented in the year ahead. Basically it is the object of this program to require that all foreign medical graduates be evaluated by this central administrative unit and that no state licensing board accept for licensure or training any foreign-trained physicians not approved by the central administrative unit. This problem of the foreign medical graduate is an important one for at the present time it is estimated that there are 4,266 foreign medical physicians serving as either interns or residents in some 805 medical hospitals in the United States. These physicians have received their education and training in various countries throughout the world. Generally speaking, little is known about either the quality or curricula of foreign medical colleges.

The meeting of the American Association of Basic Science Boards on Monday, February 7, presented a panel discussion: "The Healing Arts Look at Basic Science Examinations." Representatives of the chiropractic, medical, osteopathic, and naturopathic professions participated. C. Robert Starks, presenting the osteopathic position, reviewed briefly the history of basic science laws, noted recent changes in the attitude of the medical profession toward such laws, and raised practical and current problems concerning basic science laws as they are presently administered. He noted in particular that basic science boards have not extended the same recognition to examinations of boards of osteopathic examiners and the National Board of Examiners for Osteopathic Physicians and Surgeons that has been extended to the examinations of boards of medical examiners and the National Board of Medical Examiners, and he suggested that consideration be given to the granting of equal recognition. The presentation of Stiles D. Ezell, representing the medical profession, was largely a review of basic science laws. He did not comment, in particular, on the recent change in attitude adopted by the Joint Commission on Licensure Problems, representing the medical profession, and its recommendation that basic science laws be repealed. Both the representatives of the chiropractic and naturopathic professions were critical of basic science laws, either as to their scope of examination or the subjects which make up the basic science subjects under the various laws. J. J. Nugent commented that basic science examinations extend into matters of therapy and do not restrict themselves to pure basic science knowledge. The representative of the naturopathic profession noted that the naturopathic schools do not instruct in all subjects covered by the basic science examinations.

A panel discussion by leading medical educators and practitioners on the subject of "The Future of the Internship" was most interesting. It was recognized that members of the Council on Medical Education and Hospitals of the American Medical Association are divided in their opinions in regard to the place that an internship should take or have in the future. Some believe that the internship should become a part of undergraduate education, rather than a separate entity as it is at present. One of the panel members suggested that the clinical clerkship now taken by undergraduate students could be expanded to include the present intern training. This would permit undergraduates to proceed directly into their residency training, if they choose, upon graduation. A part of the problems pertaining to internship, it appeared, result from abuse of interns by hospitals. Some institutions, it was stated, place more importance upon the value of an intern to the staff physicians and their income than they do on the educational training which the intern receives. On the other hand it was also pointed out that an internship is the introduction of a physician to the actual responsibility of taking care of sick and injured persons. The clerkship undergone by an undergraduate student, it was noted, should be primarily for the purpose of the integration of the student's basic science knowledge with clinical study and training. Thus there was now no general agreement as to what the place of the internship will be in future training other than to recognize that the place of this training program merits continued re-evaluation and consideration by those persons responsible for the training of physicians and surgeons.

The attendance of many more doctors of osteopathy at the meetings of the Annual Congress on Medical Education and Licensure would result in wider possession of current information and understanding about problems pertaining to the licensing and education of physicians and surgeons of all schools of practice. The possession of such information would be of great help to the members of all boards of licensure when confronted with practical problems in their states.

The above comments concerning the program of the Annual Congress relate to only a part of the program, and it is urged that persons not in attendance avail themselves of the opportunity to read the reports submitted at the meeting when printed in the *Federation Bulletin* and the Educational Number of the *Journal of the American Medical Association.* A review of such publications might well bring about a clearer understanding of the benefits that can accrue from attendance at the meetings.

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RECOMMENDATIONS RELATIVE TO A HEALTH PROGRAM

MESSAGE FROM
THE PRESIDENT OF THE UNITED STATES
JANUARY 31, 1955

To the Congress of the United States:

Because the strength of our Nation is in its people, their good health is a proper national concern; healthy Americans live more rewarding, more productive, and happier lives. Fortunately, the Nation continues its advance in bettering the health of all its people.

Deaths from infectious diseases have diminished. During the past year, important progress has been made in dealing with such diseases as rheumatic fever, high blood pressure, poliomyelitis, and tuberculosis. Intensified research has produced more knowledge than ever before about the scourges of heart disease and cancer.

The 83d Congress, during the last legislative session, supported dramatic new strides in vocational rehabilitation. By 1959, consequently, we should be restoring to useful lives most persons who become disabled and who can be rehabilitated and returned to employment. In human terms, this will be a heartwarming achievement.

The 1954 amendments to the Hospital Survey and Construction Act opened another new chapter in the national drive for better health. Under these amendments, further provision was made to help build health care facilities for the chronically ill; to aid in the construction of nursing and convalescent homes; to provide for more diagnostic and treatment centers for patients who do not need hospital care; and to help make centers available for the rehabilitation of the disabled.

These achievements represent a major gain for the immediate and future welfare of countless Americans—in the health of both mind and body. Recent advances do not, however, represent our full capacity to wage war on illness and disability throughout the land.

THE IMMEDIATE NEEDS

As a nation, we are doing less than now lies within our power to reduce the impact of disease. Many of our fellow Americans cannot afford to pay the costs of medical care when

it is needed, and they are not protected by adequate health insurance. Too frequently the local hospitals, clinics, or nursing homes required for the prevention, diagnosis, and treatment of disease either do not exist or are badly out of date. Finally, there are critical shortages of the trained personnel required to study, prevent, treat, and control disease.

The specific recommendations that follow are designed to meet this threefold deficiency.

MEETING THE COSTS OF MEDICAL CARE

For most Americans, insurance—private, voluntary insurance—provides a sound and effective method of meeting unexpected hazards which may be beyond the capacity of the individual to bear. Risk sharing through group action is in the best tradition of vigorous and imaginative American enterprise.

The Government should cooperate with, and encourage, private carriers in the improvement of health insurance. Moreover, a great many people who are not now covered can be given its protection, particularly in rural areas where group enrollment is at present difficult.

Existing health insurance can also be improved by expanding the scope of the benefits provided. Not all private expenditures for medical care can or should be covered by insurance; nevertheless, many policies offered today are too limited in scope. They are principally for hospitalized illness and for relatively short periods of time.

I recommend, consequently, the establishment of a Federal health reinsurance service to encourage private health insurance organizations in offering broader benefits to insured individuals and families and coverage to more people.

In addition, to improve medical care for the aged, the blind, dependent children, and the permanently and totally disabled who are public assistance recipients, I recommend the authorization of limited Federal grants to match State and local expenditures.

Reinsurance

The purpose of the reinsurance proposal is to furnish a system for broad sharing among health insurance organizations of the risks of experimentation. A system of this sort will give an incentive to the improvement of existing health insurance plans. It will encourage private, voluntary health insurance organizations to provide better protection—particularly against expensive illness—for those who now are insured against some of the financial hazards of illness. Reinsurance will also help to stimulate extension of private voluntary health insurance plans to millions of additional people who do not now have, but who could afford to purchase, health insurance.

The Department of Health, Education, and Welfare has been working with specialists from the insurance industry, with experts from the health professions, and with many other interested citizens, in its effort to perfect a sound reinsurance program—a program which involves no Government subsidy and no Government competition with private insurance carriers. The time has come to put such a program to work for the American people.

I urge the Congress to launch the reinsurance service this year by authorizing a reasonable capital fund and by providing for its use as necessary to reinsure three broad areas for expansion in private voluntary health insurance:

1. Health insurance plans providing protection against the high costs of severe or prolonged illness;

2. Health insurance plans providing coverage for individuals and families in predominantly rural areas;

3. Health insurance plans designed primarily for coverage of individuals and families of average or lower income against medical care costs in the home and physician's office as well as in the hospital.

Medical care for public assistance recipients

Nearly 5 million persons in the United States are now receiving public assistance under State programs aided by Federal grants. Present arrangements for their medical care, however, are far from adequate. Special provision for improving health services for these needy persons must be made.

I recommend to the Congress, therefore, that it authorize separate Federal matching of State and local expenditures for the medical care needed by public assistance recipients. The separate matching should apply to each of the four federally aided categories: the aged, the permanently and totally disabled, the blind, and children deprived of parental care.

STIMULATING THE CONSTRUCTION OF HEALTH FACILITIES

Many communities in the United States today lack the hospitals, clinics, nursing homes, and other modern technical facilities required for the protection of the people's health. In other communities, structures are antiquated or otherwise deficient in construction or equipment.

Present methods of financing are not always satisfactory in meeting this problem. Many sponsors and operators are unable to qualify for grants under the recently extended Hospital Survey and Construction Act. Sponsors of health facilities often find it difficult to obtain private capital for construction.

In other fields, Government-insured loans have consistently helped produce the new construction required in the urgent national interests. The tested procedures developed by such successful Government guaranty programs as these should now be used to stimulate construction of additional health facilities.

I recommend, therefore, that the Congress authorize the Secretary of Health, Education, and Welfare to insure, for a small premium, mortgage loans made by private lending institutions for the construction of health facilities.

The continuing responsibility of the mortgagor and of the lending institution should be preserved by limiting the insurance to less than the face amount of the loan and by requiring that a mortgage loan, to be eligible for insurance, must be for less than the full value of the property. The authorizing legislation should, of course, include any needed safeguards against the encouragement of substandard or unsound projects.

HEALTH PERSONNEL NEEDS

Whether we look at health problems in terms of services for the community or for the individual—at problems of research, prevention, or treatment of disease—we find that supplies of trained personnel are critically short.

The administration's legislative program for this year therefore contains proposals addressed to crucial areas of personnel shortages. These particular areas, moreover, hold the key to other possible advances and improvements in health programs.

Two proposals are aimed at shortages in nurse personnel: First, I recommend a 5-year program of grants to State vocational education agencies for training practical nurses. Second, I recommend an expansion of Public Health Service operations to establish traineeships for graduate nurses in specialties such as nursing service administration, teaching, and research.

In addition, my recommendations for the revision of the present public health grant programs include authority for the establishment of traineeships in all public health specialties, including mental health.

PUBLIC HEALTH PROGRAMS

The Public Health Service, the Children's Bureau of the Social Security Administration, and the Food and Drug Administration are skilled and vigilant guardians of our Nation's health. All three of these agencies should be strengthened, and the programs of the Public Health Service and the Children's Bureau for aiding State health activities made more responsive to changes in State and local health needs. To this end, I urge the Congress to take the following steps:

1. Improve present grant-in-aid programs providing services for mothers, for crippled children, and for children requiring special health services. Separate funds should be provided for extension and improvement of these activities and for special projects designed to develop improved medical care techniques both for mothers and for children.

2. Permit greater flexibility in the use by the States of Federal grant funds for public health services. The States could adapt their programs more effectively to their own needs if the separate Public Health Service grants were combined into a single, unified grant-in-aid structure. In addition, separate funds should be provided for extension and improvement of existing public health programs and for special projects looking to the development of improved techniques.

3. Step up research on air pollution. As a result of industrial growth and urban development, the atmosphere over some population centers may be approaching the limit of its ability

to absorb air pollutants with safety to health. I am recommending an increased appropriation to the Public Health Service for studies seeking necessary scientific data and more effective methods of control.

4. Provide greater assistance to the States for water pollution control programs. As our population grows, and demands for water increase, and as the use of chemicals expands, our water supply problems become more acute. Intensified research in water pollution problems is needed as well as continuing authority for the Public Health Service to deal with these matters. The present Water Pollution Control Act expires on June 30, 1956. This termination date should be removed and the act should be strengthened.

5. Authorize the Public Health Service to establish traineeships for both graduate and specialized training in public health in order to increase the numbers of trained personnel.

6. Strengthen the Public Health Service Commissioned Corps by improving its status and its survivor benefits.

MENTAL HEALTH

Care for the mentally ill presents a special set of problems.

Only in the past few decades have we, as a people, begun to regard mental and emotional disorders as capable of specific diagnosis, alleviation, cure, and rehabilitation. We now know that effective preventive and control programs are possible in the field of mental health.

I recommend, therefore, new and intensified measures in our attack on mental illness. These are:

1. Strengthening of present aid to State and community programs for the early detection, control, and alleviation of mental and emotional derangements;

2. Increased budgetary support for training activities which are now authorized, so as to increase the number of qualified personnel available for care of mental patients; and

3. Authorization of a new program of mental health project grants. Such projects would aim at improving the quality of care in mental institutions and the administration of the institutions themselves. They would also search out ways of reducing the length of stay and the necessity for institutional care in as many cases as possible.

JUVENILE DELINQUENCY

As a vital part of our attack on a serious health and social problem, I also recommend new grants to the States to enable them to strengthen and improve their programs and services for the prevention, diagnosis, and treatment of delinquency in youth. There should be assistance for State planning, for coordination of all State and local agencies concerned with juvenile delinquency, for training of personnel, and for special research and demonstration projects.

INTERNATIONAL ASPECTS OF HEALTH

For half of mankind, disease and disability are a normal condition of life. This incalculable burden not only causes poverty and distress, and impedes economic development, but provides a fertile field for the spread of communism.

The World Health Organization of the United Nations is exerting forceful leadership in a cooperative worldwide movement toward better health. Its program merits adequate and growing financial support on the part of the United States. Our contribution to the World Health Organization should be raised, so that the effort to release men from the bondage of disease through international cooperation may be increased.

* * *

These recommendations to the Congress represent a broad and coordinated offensive against many of the problems which must be solved if we are to have better health for a stronger America. All the proposals recognize the primacy of local and State responsibility for the health of the community. They encourage private effort, with private funds. With the cooperation of the States and the medical profession, they can form the basis for better health for all.

DWIGHT D. EISENHOWER

THE WHITE HOUSE
January 31, 1955.

FOOD AND DRUG ACT ENFORCEMENT

A committee to evaluate the adequacy of enforcement of the federal pure food and drug laws was named on January 17, 1955, by Oveta Culp Hobby, Secretary of the Department of Health, Education, and Welfare.

The purpose of this committee, Mrs. Hobby said, is to "make recommendations as to the amount and kind of enforcement of the Federal Food, Drug, and Cosmetic Act, and related statutes, which will best serve the interests of the country." Funds for the study amounting to $21,000 were set aside from a special appropriation made by the 83rd Congress shortly before its adjournment.

BILLS IN CONGRESS

H.R. 587—Mr. Teague, of Texas. Permits persons serving in the Armed Forces on January 31, 1955, to continue to accrue educational benefits under the Veterans' Readjustment Assistance Act of 1952 (Korean G. I. Bill). Legislation made necessary by January 1, 1955, Presidential Proclamation fixing February 1, 1955, as the termination date of combatant activities in Korea, thereby terminating certain veteran benefits as of February 1, 1955. Public Law 7, approved February 15, 1955.

H.R. 2010—Mr. Hays, of Arkansas. Amends the Act creating the Commission on Intergovernmental Relations by extending for 30 days the date of the Commission's final report and termination date from June 1, 1955, to June 30, 1955. Public Law 5, approved February 7, 1955.

H.R. 2442—Mr. Teague, of Texas. Provides for additional pay of $100.00 per month for persons serving on active duty with the Armed Forces who hold a doctor's degree (or its equivalent) in mathematics, physics, chemistry, biology, or in a comparable science, and who is performing duties in the field in which he holds such degree.

H.R. 2533—Mr. Wolverton, of New Jersey. Health Service Prepayment Reinsurance Act.

H.R. 2537—Mr. Hays, of Arkansas. Provides for public accountability by tax-exempt organizations.

H.R. 2538—Mr. Simpson, of Pennsylvania. Same as H.R. 2537.

H.R. 2559—Mrs. Frances P. Bolton, of Ohio. Amends the Army-Navy Nurses Act of 1947, and related Acts, to authorize male nurses and medical specialists to be appointed as Reserve officers.

H.R. 2592—Mr. Gwinn, of New York. Individual Retirement Act of 1955. Authorizes establishment of a Restricted Retirement Fund, withdrawal of funds therefrom to be made at age 65 or upon permanent and total disability certified by a "licensed doctor of medicine or osteopathy other than the taxpayer."

H.R. 2608—Mr. King, of California. Amends the Social Security Act to provide total disability insurance benefits.

H.R. 2633—Mr. Miller, of New York. Same as H.R. 2592.

H.R. 2665—Mr. Seely-Brown, of Connecticut. To provide more equitably for the medical care of dependents of personnel of the Coast Guard under certain circumstances.

H.R. 2670—Mr. Simpson, of Pennsylvania. See H.R. 2538.

H.R. 2683—Mr. Van Zandt, of Pennsylvania. National Security Training Act.

H.R. 2685—Mr. Vinson, of Georgia. Armed Forces Dependents Medical Care Act of 1955.

H.R. 2825—Mr. Coudert, of New York. To establish a Commission on Programs for the Aging.

H.R. 2841—Mrs. Green, of Oregon. Amends Longshoremen's and Harbor Workers' Compensation Act to provide increased benefits in cases of disabling injuries.

H.R. 2844—Mr. Hayworth, of Michigan. Amends Social Security Act to pay old-age insurance benefits to certain disabled individuals who are under 65 years of age.

H.R. 2847—Mr. Hinshaw, of California. Amends the Universal Military Training and Service Act to establish a Scientific Specialists Board to receive and consider applications for suspension of obligations to serve in the Armed Forces, and to certify to the Secretary of Defense for such suspension the name of each applicant who in its judgment would be more valuable to the interests of national security and defense as a scientist, technician, or engineer than as a member of the Armed Forces.

H.R. 2886—Mr. Vinson, of Georgia. Extends the Doctor Draft Act from July 1, 1955 to July 1, 1957.

H.R. 2962—Mr. Ayres, of Ohio. Extends educational and all other benefits of the Korean G. I. Bill except pensions and non-service-connected hospitalization to persons who served in the Armed Forces during the period beginning February 1, 1955.

H.R. 2967—Mr. Brooks, of Louisiana. National Reserve Plan.

H.R. 3005—Mr. Vinson, of Georgia. Extends the Universal Military Training and Service Act from July 1, 1955, to July 1, 1959. Passed House February 8, 1955. Amends the Act to reduce the liability for induction from age 35 to age 26 for young men who under the provisions of existing law are permitted to enlist in organized units of the National Guard prior to attaining the age of 18½. Also amends the Act to prohibit the future induction of any *regular* (not *special*) registrant who has completed 6 months or more of honorable active duty service in the Armed Forces or 24 months or more in the Public Health Service. Also amends the Act to provide, in effect, that in arriving at a determination as to whether a registrant's employment is necessary to the maintenance of the national safety, health, or interest, Selective Service may not take into consideration the existence or nonexistence of a surplus of any agricultural commodity.

H.R. 3007—Mr. Allen, of California. Amends the District of Columbia Code to permit divorce for permanent and incurable unsoundness of mind.

H.R. 3009—Mr. Brooks, of Louisiana. Armed Forces Dependents Medical Care Act of 1955.

H.R. 3015—Mr. McMillan, of South Carolina. To establish a Workmen's Compensation Law for the District of Columbia.

H.R. 3089—Mr. Buckley, of New York. To provide for voluntary coverage under the Federal Old-Age and Survivors Insurance System for lawyers engaged in the practice of their profession.

H.R. 3103—Mr. Dollinger, of New York. Same as H.R. 3089.

H.R. 3109—Mr. Fine, of New York. Same as H.R. 3089.

H.R. 3112—Mr. Fogarty, of Rhode Island. Authorizes payroll deductions upon request from compensation of Federal employees for payment of certain life and hospitalization insurance and credit union savings deposits.

H.R. 3113—Mr. Gamble, of New York. Same as H.R. 2592.

H.R. 3292—Mr. Reed, of New York. Amends the maternal and child-health, crippled children, and child-welfare provisions of the Social Security Act.

H.R. 3293—Mr. Reed, of New York. Amends the public assistance provisions of the Social Security Act to provide separate matching of assistance expenditures for medical care.

H.R. 3297—Mr. Burnside, of West Virginia. Authorizes grants for construction and equipment, or expansion of medical schools. "The term 'medical school' means a school, including related facilities, maintained primarily as a school of medicine, whether or not also maintained for the education and training of health personnel other than physicians."

H.R. 3322—Mr. McCormack, of Massachusetts. To improve the administration of the program for the utilization of surplus property for educational and public health purposes.

H.R. 3458—Mr. Priest, of Tennessee. Health Improvement Act of 1955. To improve the health of the people by encouraging the extension of voluntary prepayment health services plans, facilitating the financing of construction of needed health facilities, assisting in increasing the number of adequately trained nurses and other health personnel, improving and expanding programs of mental health and public health, and for other purposes.

H.R. 3459—Mr. Priest, of Tennessee. Medical Research Act of 1955. "Sec. 702. It is the purpose of this title to provide for grants-in-aid to accredited and nonprofit universities and schools of medicine, dentistry, and osteopathy, hospitals, laboratories, and other nonprofit institutions, engaged in or competent to engage in research, for the purpose of defraying the cost of construction of facilities, or the installation of equipment, needed for the conduct of research into the causes of and possible cures for crippling and killing diseases, including cancer, heart disease, poliomyelitis, nervous disorders, mental illness, arthritis and rheumatism, blindness, cerebral palsy, and muscular dystrophy."

H.R. 3492—Mr. Williams, of Mississippi. Amends Internal Revenue Code to remove the 3 per cent limitation on the amount of medical and dental expenses which may be deducted from gross income.

H.R. 3543—Mr. Anfuso, of New York. Same as H.R. 3297.

H.R. 3574—Mr. Coudert, of New York. Same as H.R. 2592.

H.R. 3599—Mrs. Kelly, of New York. Extends Federal OASI to lawyers.

H.R. 3610—Mr. Roberts, of Alabama. Amends Social Security Act to pay old-age insurance benefits to certain disabled individuals who are under retirement age.

H.R. 3615—Mr. Van Zandt, of Pennsylvania. To provide for the equitable adjustment of compensation for physicians assigned to residency training in the Veterans Administration.

H.R. 3654—Mr. Berry, of South Dakota. Extends Federal OASI to self-employed farmers and ranchers on a voluntary basis.

H.R. 3679—Mr. McCormack, of Massachusetts. Amends Internal Revenue Code relating to unlimited deduction for charitable contributions.

H.R. 3680—Mr. McDonough, of California. Provides for intensive research into causes and effects of air pollution.

H.R. 3695—Mr. Patterson, of Connecticut. Amends Atomic Energy Act to establish Congressional research scholarships for undergraduate or graduate study in certain basic sciences.

H.R. 3709—Mr. Simpson, of Pennsylvania. Amends Internal Revenue Code relating to unlimited deduction for charitable and other contributions.

H.R. 3711—Mr. Sisk, of California. Provides vocational rehabilitation for persons who serve in the Armed Forces after January 31, 1955.

H.R. 3715—Mr. Udall, of Arizona. Amends Outer Continental Shelf Lands Act to apply revenues thereunder to grants-in-aid of primary, secondary, and higher education.

H.R. 3720—Mr. Wolverton, of New Jersey. Same as H.R. 3458.

H.R. 3770—Mr. Frelinghuysen, of New Jersey. Authorizes Federal assistance to increase public elementary and secondary school construction.

H.R. 3777—Mr. Simpson, of Pennsylvania. Relating to information required from certain tax-exempt organizations.

H.R. 3809—Mr. Teague, of Texas. Authorizes transfer of hospitals and related facilities between the Veterans Administration and the Department of Defense.

H.R. 3824—Mr. McConnell, of Pennsylvania. Same as H.R. 3770.

H.R. 3893—Mr. Curtis, of Missouri. Amends Internal Revenue Code to permit deduction of medical expenses without regard to maximum limitations of existing law.

H.R. 3911—Mr. Bolton, of Ohio. Amends Internal Revenue Code to remove limitations on amount of medical and dental expenses which may be deducted, and to permit taxpayers using the standard deduction to deduct such expenses.

H.R. 3931—Mr. Patterson, of Connecticut. Amends Internal Revenue Code to provide, in the case of individual taxpayers, a deduction equal to 30 per cent of amounts paid as tuition for college or university students.

H.R. 3937—Mr. Radwan, of New York. Establishes a Medical Advisory Committee on Alcoholism.

H.R. 3945—Mr. Roosevelt, of California. Same as H.R. 3715.

H.R. 3991—Mr. Bartlett, of Alaska. Providing for the location, establishment, construction, equipment, and operation of a hospital for the mentally ill of Alaska.

H.R. 4003—Mr. Fino, of New York. Amends the Internal Revenue Code to permit a taxpayer to deduct tuition expenses paid by him for the education of his children.

H.R. 4016—Mr. Young, of Nevada. To provide for a more effective control of narcotic drugs.

S. 480—Mr. Humphrey, of Minnesota (for himself and Mr. Ives, of New York). School Construction Act of 1955.

S. 539—Mr. Humphrey, of Minnesota. H.R. 2010 passed in lieu thereof.

S. 594—Mr. Morse, of Oregon, and others. Same as H.R. 2841.

S. 631—Mr. Mundt, of South Dakota, for himself and Mr. Smith of New Jersey. Amends the United States Information and Educational Exchange Act of 1948, relating to educational exchange and other cultural programs under such Act.

S. 658—Mr. Ives, of New York. To establish a Commission on Programs for the Aging.

S. 666—Mr. Neely, of West Virginia. Extends the period of authorization of appropriations for the hospital center and facilities in the District of Columbia.

S. 686—Mr. McClellan, of Arkansas, and others. Public School Construction Act of 1955. Provides Federal financial assistance to the States in the construction of public elementary and secondary school facilities.

S. 693—Mr. Potter, of Michigan, and others. Establishes a United States Commission on the Aging and the Aged.

S. 724—Mr. Purtell, of Connecticut. Establishes a President's Commission on Mental Health, to consist of eighteen members who shall be eminent representatives of the fields of psychiatry, mental hospital administration, medical education, physical medicine and rehabilitation, and allied mental health fields, and of representatives of the Council of State Governments.

S 772—Mr. Hill, of Alabama, and others. Same as H.R. 3715.

S. 781—Mr. Capehart, of Indiana. Establishes in the Department of Defense a United States Armed Forces Medical Academy to train selected persons for service as doctors with the Armed Forces. The course of instruction at the Academy would be 4 years and "shall meet the requirements established for accrediting medical schools, with special emphasis on military medicine."

S. 817—Mr. Langer, of North Dakota. To provide maternity leave for Government employees.

S. 848—Mr. Purtell, of Connecticut. National Mental Health Act Amendments of 1955.

S. 849—Mr. Hill, of Alabama, for himself and Mr. Bridges, of New Hampshire. Medical Research Act of 1955. "Sec. 702. It is the purpose of this title to provide for grants-in-aid to accredited and nonprofit universities and schools of medicine, dentistry, and osteopathy, hospitals, laboratories, and other nonprofit institutions, engaged in or competent to engage in research, for the purpose of defraying the cost of construction of facilities, or the installation of equipment, needed for the conduct of research into the causes of and possible cures for crippling and killing diseases, including cancer, heart disease, poliomyelitis, nervous disorders, mental illness, arthritis and rheumatism, blindness, cerebral palsy, and muscular dystrophy."

S. 886—Mr. Smith, of New Jersey, and others. Same as H.R. 3458.

S. 887—Mr. Martin, of Pennsylvania. Amends Internal Revenue Code relating to unlimited deduction for charitable and other contributions.

S. 929—Mr. Hill, of Alabama, and others. To provide for aid to the States in the fields of practical nursing and auxiliary hospital personnel services.

S. 932—Mr. Russell, of Georgia. Amends Federal Employees Compensation Act regarding certain eligibility requirements, in connection with the payment of benefits to certain officers and enlisted men of the Army Reserve.

S. 934—Mr. Russell, of Georgia, for himself and Mr. Saltonstall, of Massachusetts. Armed Forces Dependents Medical Care Act of 1955.

S. 936—Mr. Russell, of Georgia, for himself and Mr. Saltonstall, of Massachusetts. Career Incentive Act of 1955. Increases incentives for members of uniformed services.

S. 968—Mr. Smith, of New Jersey, and others. School Construction Assistance Act of 1955. Authorizes Federal assistance to States and communities to enable them to increase public elementary and secondary school construction.

S. 969—Mr. Flanders, of Vermont. Amends the Universal Military Training and Service Act relative to the process of selection, for "the fullest possible utilization of the nation's technological, scientific, and other critical manpower resources."

S. 980—Mr. Cotton, of New Hampshire. Defense Scholarships Act of 1955, for study, at the college or graduate level, of subjects in the fields of engineering, physics, chemistry, or sciences closely related to engineering, physics, or chemistry.

S. 999—Mr. Bender, of Ohio. Amends the Social Security Act so as to remove the limitation upon the amount of outside income which an individual may earn while receiving benefits thereunder.

S. 1004—Mr. McClellan, of Arkansas, and others. To improve the administration of the program for the utilization of surplus property for educational and public health purposes.

S. 1027—Mr. Neuberger, of Oregon. Same as H.R. 3991.

S. 1028—Mr. Neuberger, of Oregon. Alaska Mental Health Act.

S. 1076—Mr. Humphrey, of Minnesota. Health Services Facilities Act.

MIDDLETON HEADS VA MEDICAL

On March 1, 1955, Dr. William S. Middleton, Dean of the University of Wisconsin Medical School since 1935, succeeds Admiral Joel T. Boone as Chief Medical Director of the Veterans Administration. Admiral Boone had held the post since March 1, 1951, and was previously White House physician for Presidents Harding, Coolidge, and Hoover.

Dr. Middleton is a member of the national VA Medical Advisory Committee on Education and Chairman of the Dean's Committee affiliated with the Madison, Wisconsin, VA Hospital. He was born in Norristown, Pennsylvania, on January 7, 1890, and received his medical degree from the University of Pennsylvania in 1911. Following his internship at the Philadelphia General Hospital, he joined the staff of the University of Wisconsin Medical School in 1912 as an instructor in clinical medicine. He served as a medical officer in World War I, and in World War II was the chief consultant for medicine in the European Theatre of Operations.

At the present time he is a member of the Advisory Council to the Assistant Secretary of Defense (Health and Medical).

The position of Chief Medical Director in the VA entails responsibility for conduct of the biggest medical program in the United States. The VA presently is operating 172 hospitals which care for nearly a half-million veteran-patients each year, provides daily domiciliary care for nearly 17,000 veterans, and operates 105 clinics serving more than 140,000 veterans each month.

MOBILIZATION AND HEALTH MANPOWER

In spite of expanding educational facilities to train health personnel, our national population growth and the rising level of demands for health services will cause a continuing shortage of health personnel "for many years to come" according to a February, 1955, Report to Arthur S. Flemming, Director, Office of Defense Mobilization, entitled "Mobilization and Health Manpower," which was prepared by the ODM Health Resources Advisory Committee.

The outlook is strikingly presented in the following introduction to the Report:

PREFACE

We of this Committee are gravely concerned with the quantity and quality of health services in this country. We feel bound to look not only at the present but also at the future and at the factors that are now deciding the future.

The first of these factors is the expense in time and money required of whoever chooses to enter medicine or dentistry. Primary and secondary education take a boy from his sixth through his eighteenth year—twelve years. Medical education now takes as much again—four years of college, four of medical school, two years or more of internship and residency, and now two added years of military service. This then means that the preparation of a physician for any kind of community service requires a total of 24 years. Dentistry requires only a little less time.

There are no short cuts nor substitutes. The burden of 22 or 24 years of financial outlay for either dentistry or medicine—gives us real

concern. Medicine may, so to speak, price itself out of the market by losing its appeal to a considerable group of young men. Viewed as a commercial investment a medical career calls for capital at the beginning and heavy fees charged later to make up for that capital outlay. Viewed as a service to society a medical career involves a long preparation for a demanding professional life.

The post-war emergency brought with it the necessity for the selective call-up of physicians and dentists. It appears that this emergency will continue for sometime. Obligatory military service will add for virtually all our young doctors two years of experience before they have the freedom to decide how and where they will practice their profession. The Government thus now assumes the responsibility for a period equal to a fifth of the total time devoted to medical or dental education. This is full of potentialities, dangers, and new problems.

Civilian hospital organization as well as medical school organization has been built around energetic teaching and steady learning. For interns and residents the opportunity to learn is paramount. They want to learn even at the price of being overworked; they have good reason to distrust a leisurely tempo of professional work, and the best of them hate idleness even if it be in the name of staffing. Unless the two years of obligatory military medical service can be built around vigorous teaching and learning these years will come to be regarded as the penalty and inescapable frustrations of having chosen a medical career. We may well be concerned lest such disappointment and embitterment spread to the point of aversion to entering careers to whose cost and length has been added frustration. The alternative solution could be cynicism and vindictive commercialism.

These problems are basic to the future of medicine in this country. Civilian medicine and military medicine have a joint responsibility to find answers to them.

NEW FCDA HEALTH DIRECTOR

Appointment of Dr. John M. Whitney as director of Health Services, Federal Civil Defense Administration, effective January 17, 1955, was announced by Val Peterson, Administrator.

Dr. Whitney joined the U. S. Public Health Service Reserve on September 1, 1952. After serving as Medical Officer of FCDA Region 3, he was transferred on January 1, 1954, to the National Office of FCDA as director of the Casualty Care Division of the Health Office. He is a commissioned officer in the Regular Corps of the USPHS with rank of Medical Director.

A graduate of the University of Mississippi, Dr. Whitney received his medical degree from Tulane University in 1934 and took a postgraduate course in Public Health Administration at Vanderbilt University in 1937.

Before joining FCDA, he served as Health Officer for the City of New Orleans for 8 years from 1941, was Medical Director for the Midwestern area, American National Red Cross in 1949, and Medical Director of the Red Cross, Eastern area in 1950.

Dr. Whitney will replace Dr. Robert H. Flinn, who has been reassigned by the USPHS to the Office of the Chief, Bureau of States Services, in Washington, D. C.

Current Literature

EXPERIMENTS ON PAIN REFERRED FROM DEEP SOMATIC TISSUES

Systematic studies of deep somatic pain referral patterns following injection of the paravertebral muscles of the neck and back have been made by B. Feinstein, M.D., and others, and are discussed in *The Journal of Bone and Joint Surgery,* October, 1954.

Injection of the paravertebral muscles (musculotendinous tissue immediately adjacent to the spinal midline) was made with 6 per cent saline solution at each intervertebral level from the atlanto-occipital area to the lower part of the sacrum. Following raising of an intradermal wheal with 1 per cent procaine solution in the midline midway between two spinous processes, a 2-inch, 24-gauge needle was used to inject 0.5 to 1 ml. of the saline solution. The needle, after puncturing the skin, was directed about 15 degrees either right or left. Adiposity of the subject determined the depth of insertion.

As the subject described the character and spread of pain, one observer recorded his comments and a second sketched the site of the pain on an outline of the body and skeleton. Each individual pattern was transferred to transparent paper containing fine square rulings and then was cut out. The patterns of five subjects were superimposed, and the gradations in shading which resulted gave the average distribution of deep pain for each segmental level.

Injections were also made into limb muscles in order to study deep pain patterns activated by peripheral stimuli as opposed to axial stimuli. Recording of the spread of pain was made in the same manner as with the other injections.

Pain intensity varied from none to extreme, and, although it was variously described, all agreed that it was "deep," and "aching" was the word used by most of the subjects. The amount of saline injected influenced the amount of pain. In most cases, the intensity reached its peak within 1 minute, following a gradual increase. At first it was diffuse and poorly localized in the vicinity of the injection, but before attaining its peak, it spread from this area, sometimes in a continuous manner, but more frequently a discontinuous referral of pain to a distant area occurred. The pain elicited from muscles was accompanied by a characteristic group of autonomic reactions which varied greatly in type and intensity in different individuals.

Although the distributions overlapped considerably and their locations differed from those of conventional dermatomes, they were found to approximate a segmental plan. It was not possible to induce pain in the radial aspect of the upper arms and in the feet. There was less regularity in suggesting segmental patterns after injections into individual peripheral limb muscles.

Concentric areas of hypalgesia, rather than zones of hyperalgesia or Head's zones, overlay the sites of deep induced pain. There was no interference with the referral segmental pain by sympathetic and plexus blocks, and thus a primarily spinal integrative mechanism is suggested.

RADIOACTIVE ISOTOPES IN MANAGEMENT OF CARCINOMATOSIS OF SEROUS BODY CAVITIES

The results in a series of 163 patients with carcinomatous effusions in the serous cavities who were treated with radioactive colloidal gold are presented by Edward M. Kent, M.D., and others in *Archives of Internal Medicine,* September, 1954.

Intractable pleural or peritoneal effusion due to proved cancer has been the indication for treatment with radioactive colloidal gold in this series.

Two types of protective shields have been devised to cover the injection syringe and protect the handlers. One is a lead jacket 5/16 of an inch in thickness for covering the barrel of a 30-cc. syringe. Studies have revealed that 7.5 milliroentgens of gamma radiation pass through this jacket in 1 minute, and the exposure to the administrator's hands is below the hazardous level since he handles it for less than a minute. The second shield, for covering any standard 50-cc. syringe, consists of a lead tube ½ inch thick which is covered outside and lined inside with brass ⅛ inch thick. This shield offers about twice the protection of the first type.

After most of the fluid has been withdrawn by ordinary throacentesis, a Y-connector is attached to the needle, thus permitting passing of the isotope or isotonic sodium chloride solution into the pleural space. Following withdrawal of fluid from the peritoneal cavity by means of a small trocar and cannula, a small polyethelene tube is passed through the cannula and the cannula withdrawn over it. Injection is made through the tube, the tubing is withdrawn, and the trocar wound is closed.

The authors have adopted a standard dose of 100 millicuries for injection into either the pleural or peritoneal cavity.

In most instances only a single dose of radioactive gold was given, but in some cases in which the first treatment failed, more than one dose was given, usually within 3 weeks of the first.

Although it has not been proved, it is believed that radioactive colloidal gold suppresses malignant effusions through the superficial radiation damage which it causes.

In evaluating the results of treatment, those cases in which there was no further need for aspiration of fluid were classified as excellent; those in which additional taps were necessary were classified as improved; whenever fluid formation continued, even though it was less rapid, treatment was classed as a failure. Results were favorable in about half of the 163 patients; toxic manifestations were rare, but in cases in which they occurred, they were mild.

POSTOPERATIVE AEROSOL THERAPY

Even though all postoperative patients are subject to chest complications, a number of factors and conditions predispose to them. Nebulization or aerosol therapy in the postoperative management of the patient is discussed by Max S. Sadove, M.D., Cecelia E. Miller, M.D., and Arthur T. Shima, M.D., in *The Journal of the American Medical Association,* October 23, 1954.

Some of the important factors contributing to chest complications postoperatively are the patient's preoperative condition, the operative site, defense mechanisms of the respiratory system, and the consistency of secretions.

Among conditions which postoperatively contribute to chest complications are agents with a tendency to dry the secretions or make them more viscid, respiratory depressants, debilitating conditions which lower resistance, diaphragmatic function-limiting mechanisms or conditions, depression of the cough reflex and ciliary activity by excessive use of narcotics, respiratory obstruction, any condition producing leakage or transudate or exudate into the alveoli or engorgement of lung tissue, and cardiovascular pathologic states.

Effects of aerosol inhalation therapy include vasoconstriction of the respiratory mucosa, dilatation of the bronchi, antihistaminic and antibiotic effects, administration of digestive enzymes, and a detergent or wetting effect. In addition, there are special indications, such as following tracheotomy.

When nebulization therapy is prescribed, specific drugs and agents should be used, and there should be definite purposes and objectives for its use. As with drugs or any kind of therapy, routine practices should be condemned.

SURGICAL OCCLUSION OF THE ANTERIOR CHOROIDAL ARTERY IN PARKINSONISM

Following occlusion of the left anterior choroidal artery to repair accidental tearing during pedunculotomy in a man incapacitated by right-sided tremor and rigidity, it was noted that tremor and rigidity disappeared from the extremities on the right side without lessening of motor power. Speculation that the unplanned arterial occlusion was the cause led to investigation and to planned occlusion for far advanced cases of parkinsonism. The rationale and anatomic basis for occlusion of the anterior choroidal artery in the parkinsonian syndrome, the selection of patients, the technic for operation, and the results in a series of 30 operations are reported by Irving S. Cooper, M.D., in *Surgery, Gynecology and Obstetrics,* August, 1954.

Alleviation of resting tremor and rigidity in contralateral extremities was significant in certain far advanced, incapacitated parkinsonian patients following occlusion. In some cases there was improvement in speech, swallowing, masked facies, posture, and gait. Because of progressive improvement, several patients who had been completely dependent were able to care for themselves. Patients with postencephalitic parkinsonism whose principal incapacitation was rigidity showed the most favorable results.

The surgical mortality rate was 13.3 per cent, but it is believed that this rate will be significantly lowered by using the criteria for patient selection which have evolved from this study. Such phenomena as anhydrosis of the ipsilateral face, trunk, and extremities; lip smacking movements; visual hallucinations; and mild memory defect for recent events occurred in several cases but proved to be transitory. Somnolence was the most commonly observed side effect during the postoperative period; it was counteracted by the use of benzedrine.

Although no patient has had recurrence of symptoms following proper obliteration of the anterior choroidal artery, it is pointed out that a longer period of follow-up will be necessary before any conclusions can be reached.

REDUCTION OF INTUSSUSCEPTION BY BARIUM ENEMA

The principles involved in the standard operation for manual reduction of an intussusception and in hydrostatic pressure reduction are essentially the same. A policy of first attempting hydrostatic pressure reduction in all children with intussusception regardless of its duration, followed, if necessary, by operation if the lesion persists or to confirm reduction is discussed by Mark M. Ravitch, M.D., in *Surgery, Gynecology and Obstetrics,* October, 1954.

The operating room is advised to prepare for operation as soon as a diagnosis of intussusception is made or suspected. A Foley bag catheter with a 45-cc. balloon is inserted into the infant's rectum and the balloon is distended. Blood or intravenous fluids are administered if the infant is in a state of shock or is dehydrated. A large reservoir, quite full of an ordinary suspension of barium, is elevated 3 feet above the table. The barium is then permitted to run into the bowel and is observed with the fluoroscope. When the point of intussusception is reached, a meniscus is formed around it. The meniscus lengthens as the pressure increases, until the intussusception is suddenly pushed back and the meniscus flattens. This process occurs over and over again until the reduction reaches the cecum and passes the ileocecal valve. It is important to ascertain that the barium flows freely into the ileum.

Maintenance of uninterrupted hydrostatic pressure with smoothly flowing barium is most important. Treatment should be persisted in so long as reduction proceeds. If the barium is expelled, the procedure must be repeated.

After reduction is effected, powdered charcoal is placed in the infant's stomach, and, in 6 hours, an enema is given. Recovery of the charcoal proves reduction was complete.

In 65 cases of intussusception in infants and children, barium enema was the treatment used by the author. Reduction was accomplished by this means alone in 50 patients 77 per cent). It was necessary to complete the reduction by operative means in the other cases. In 19 of his past 21 cases, reduction was by barium enema alone. No deaths occurred in the series.

PEUTZ'S DISEASE

The increasing frequency of Peutz's disease in the past 5 years is pointed out by Donald C. Collins, M.D., on the President's Page of *The American Journal of Proctology,* September, 1954.

At least twenty cases have been reported in American and British literature during this time. The syndrome, which is apparently inherited as a simple mendelian dominant factor, is characterized by melanin spots developing on the fingers, lips and buccal mucosa early in childhood and the rather constant occurrence of multiple adenomatous polyps throughout the gastrointestinal tract. The disease and its symptoms are described and the question raised of professional advice concerning marriages of persons with the condition. Questions concerning treatment are also considered, and a plea is made for serious consideration and concerted study of Peutz's disease in order to crystallize medical thinking and establish a proper course of treatment.

Book Notices

BALLISTOCARDIOGRAPHY. The Application of the Direct Ballistocardiograph to Clinical Medicine. By William Dock, B.S., M.D., F.A.C.P., Professor of Medicine, State University Medical Center at New York City, College of Medicine; Visiting Physician, Kings County Hospital, Brooklyn; Consultant in Medicine, Veterans Administration Hospital at Brooklyn; Harry Mandelbaum, M.D., F.A.C.P., Lecturer, State University Medical Center at New York City, College of Medicine; Associate in Medicine, The Jewish Hospital of Brooklyn; Physician in Charge, Hypertension and Nephritis Clinic at the Jewish Hospital of Brooklyn; Attending in Medicine, The Jewish Sanitarium and Hospital for Chronic Diseases, Brooklyn; Attending in Medicine, Brooklyn Hebrew Home and Hospital for the Aged, Brooklyn; and Robert A. Mandelbaum, B.A., M.D., Assistant in Medicine, The Jewish Hospital of Brooklyn; Adjunct in Medicine, The Jewish Sanitarium and Hospital for Chronic Diseases, Brooklyn; Assistant in Cardiology, Beth-El Hospital, Brooklyn. Cloth. Pp. 293. Price $9.50. The C. V. Mosby Company, 3208 Washington Blvd., St. Louis 3, Missouri, 1953.

The authors shed considerable light on the new field of ballistocardiography. Their contribution should lead to a fuller understanding of this valuable new method of physical examination and open the way to wider use of it. They give the reader the benefit of their experience in developing simple methods of inscribing the ballistocardiogram, and in applying these methods to the study of disease. And having offered instructions in the use of this diagnostic method to many novices, the authors understand the difficulties involved in learning how to operate ballistographs and to interpret the resulting inscriptions. This makes them sympathetic teachers.

"In the presentation of this valuable new method of physical examination, we have laid especial emphasis on the relation of the ballistic impulses experienced by the body to the waves of pressure and blood flow set in motion in the heart and great vessels by systolic contraction and by diastolic relaxation of the auricles and ventricles. This has led to exposition and discussion of phases of cardiac activity which were unknown or scarcely noted until recent years," the authors note in the Preface.

The book has much to offer in illustrative material. There are records of the first string galvanometers, inscribed directly on photographic plates. Tracings taken under the usual conditions of office practice and on the wards of a large general hospital are presented.

STELLATE GANGLION BLOCK, Techniques—Indications—Uses. By Daniel C. Moore, M.D., Director, Department of Anesthesiology, Mason Clinic; Chief of Anesthesia, Virginia Mason Hospital, Seattle, Washington. Cloth. Pp. 280, with illustrations. Price $10.50. Charles C Thomas, Publisher, Springfield, Ill., 1954.

Stellate ganglion block is a useful adjunct to the armamentarium, not only of the anesthesiologist, but of the clinician as well. During World War II and since that time it has come into great prominence in this country for the treatment of various vascular and medical disturbances of the upper extremity. This reviewer, therefore, awaited eagerly the publication of Moore's book, since the only text he had available on this subject was the French edition of Arnulf's "L'infiltration Stellaire," published in 1947.

The format of this new text follows that of Dr. Moore's now well-known handbook, "Regional Block." The anatomic illustrations are beautifully executed.

Chapter II on the anatomy and chapter III on the physiology of the stellate ganglion are outstanding, as is chapter VII which deals with the instrumentarium necessary, including that for the handling of possible complications. Again and again the basic precautions in utilizing this technic are emphasized.

Chapter XXIV deals with cerebrovascular accidents and brings into focus the debatable clinical efficacy of stellate ganglion block in this condition. The author cites enthusiastic reports from other clinics and teaching centers and then concludes, "At the Mason Clinic, we have treated 26 patients with cerebrovascular accidents within twenty four hours of their occurrence. No definite diagnosis was established other than the fact that gross blood (or blood cells) was not present in the spinal fluid. Four of these cases showed miraculous improvement and four showed moderate improvement immediately following the block. Eighteen of the patients showed no improvement." There are separate chapters on the use of stellate ganglion block in many important conditions, including Raynaud's Disease, thromboembolic phenomena of the upper extremity, various neurovascular disturbances, abnormal cardiac rhythm, and the postoperative radical mastectomy syndrome.

The anterior or paratracheal approach to the ganglion is stressed. In the hands of the reviewer this technic has also been the safest. An appendix details various technics by which the stellate ganglion has been blocked other than those used by the author.

The text is well written in an "easy to read, easy to remember" style. Each chapter includes an excellent list of references including those to foreign literature.

A. A. Golden, D.O.

LOW BACK PAIN AND SCIATICA. By Louis T. Palumbo, M.D., Des Moines, Iowa. Cloth. Pp. 104, with illustrations. Price $3.00. J. B. Lippincott Company, East Washington Square, Philadelphia 5, 1954.

"Oh, my aching back!" This universal complaint of mankind has been uttered since time immemorial. Low-back pain "has plagued humanity, no doubt, from the time man assumed the upright position, changing from a quadruped to a biped. When these changes occurred, his motor-skeletal development was that of a quadruped and was certainly inadequate to combat the laws of gravity as a biped," comments Dr. Palumbo.

After a discussion of the nature of back pains in the introduction, the balance of the book is devoted to basic anatomic considerations, etiologic factors, establishment of diagnosis, examination and diagnosis, intervertebral disks, special studies, and treatment—conservative and surgical. Conservative treatment is given more attention than the surgical for, as Dr. Palumbo concludes, therapy in about 90 per cent of the cases is limited entirely to nonoperative measures.

For a book that barely exceeds the 100-page mark, the text is amply illustrated, with those pictures on posture being exceptionally descriptive. The book also is bibliographically comprehensive.

THE DIGESTIVE TRACT IN ROENTGENOLOGY. By Jacob Buckstein, M.D.; Assistant Professor of Clinical Medicine, Cornell University Medical College; Visiting Roentgenologist (Alimentary Tract Division), Bellevue Hospital, New York City; Attending Gastro-enterologist, Beth David Hospital, New York City; Consultant to the Central Islip State Hospital, New York; Norwalk General Hospital, Norwalk, Connecticut; Good Samaritan Hospital, Suffern, New York; formerly Consultant in Gastroenterology to the U.S. Public Health Service and the U.S. Veterans Bureau. Ed. 2. 2 Vols. Pp. 1202, with illustrations. Price $30.00. J. B. Lippincott Co., East Washington Sq., Philadelphia 5, 1953.

Since the first edition of this book was published in 1948, it has become a standard reference on roentgenology as it applies to the digestive tract. Expanded from the original single volume into the two-volume second edition, "The Digestive Tract in Roentgenology" should maintain its position on the bookshelves of internists, gastroenterologists, radiologists, and surgeons.

During his 33 years in the Gastro-intestinal Roentgen Division of Bellevue Hospital, Dr. Buckstein has been confronted with an enormous amount of material—a truly comprehensive source for a book on roentgenology. Included in the text are verified roentgenographic diagnosis as determined by operation or autopsy, with histologic confirmation. He also uses brief case histories to intertwine the essential clinical features with

roentgenographic and pathologic findings. The major emphasis is placed on those lesions which the internist, the gastroenterologist, and the radiologist are most apt to meet in their practice.

Volume I deals with the hypopharynx and the esophagus, the stomach, and the duodenum, while Volume II discusses the small intestine, the large intestine, herniation and eventration of the diaphragm, the gallbladder and the bile ducts, and the spleen, liver, and pancreas. Much new material has been added to the second edition, especially in the following chapters: The Postoperative Stomach; Duodenal Ulcer; Congenital Occlusion of the Small Intestine; Retroperitoneal Hernia, Displacement of the Small Intestine; Tumors of the Small Intestine; the Normal Colon, Including Congenital and Other Anomalies; the Appendix; Granulomas and Benign Tumors of the Colon; the Normal Biliary Tract; Cholangiography; Roentgen Visualization of the Spleen and Liver; and Roentgen Diagnosis of Diseases of the Pancreas. Other chapters have been revised and brought up to date. A minor defect of the first edition—the scant information on the digestive tract in infancy—has been remedied in the second edition.

The two volumes contain abundant illustrations, which are skillfully reproduced and closely correlated to the text. The bibliographic index and the subject index, both of which are located at the end of the second volume, add to the usefulness of the text. All physicians called upon to diagnose and treat disorder of the digestive tract will find the two volumes of invaluable help.

TEXTBOOK OF PEDIATRICS. Edited by Waldo E. Nelson, M.D., Professor of Pediatrics, Temple University School of Medicine; Medical Director of Saint Christopher's Hospital for Children. With the Collaboration of Seventy Contributors. Ed. 6. Cloth. Pp. 1581, with illustrations. Price $15.00. W. B. Saunders Company, West Washington Square, Philadelphia 6, 1954.

There is no field of specialized medicine as broad as pediatrics. Not only does it involve the practicing of general medicine in a given age group, but it also deals with guiding the development of growing bodies and minds and treating a special group of diseases. Taking these factors into consideration, the editor has done a remarkable job in compiling and editing this comprehensive one-volume edition on pediatrics. Revised for the sixth time since the original volume was published in 1933, "Textbook of Pediatrics" has become a standard reference in this specialized field. It includes the contributions of seventy specialists.

There also is an appendix of helpful tables and charts dealing with Normal Blood Values, Normal Cerebrospinal Fluid Values, Water and Salt Requirements of Nonactive Infants and Children, Food Values, Method for Diet Calculation, Elimination Diets (Rowe) for the Study and Control of Food Allergy, Nomogram for Estimation of Surface Area from Height and Weight, Conversion Tables of Apothecaries' Measures to Metric Equivalent, and Directions for Preparation of Solutions of Different Percentage Composition. The 62-page index, detailed table of contents, and generous use of subheads facilitate the use of the book.

NASH'S SURGICAL PHYSIOLOGY. Edited by Brian Blades, M.D.; Professor of Surgery, The George Washington University School of Medicine. Ed. 2. Cloth. Pp. 687, with illustrations. Price $12.50. Charles C Thomas, Publisher, 301 East Lawrence Ave., Springfield, Ill., 1953.

Dr. Joseph Nash, author of the first edition, died shortly after the book was published in 1942. His contribution—a practical approach to physiology for the surgeon—proved to be so valuable that his textbook was kept intact and reprinted five times. When a revision finally became necessary, due to changes in surgical methods as well as to new physiologic knowledge, Dr. Brian Blades and eleven other physicians brought the book up to date. Many of Dr. Nash's chapters were left untouched, but others had to be revised, and still others replaced. Basically, nevertheless, it remained "Nash's Surgical Physiology"—the same book that brought surgical physiology within the grasp of the average surgeon.

Specific problems of clinical work, surgical shock, hemorrhage, burns, and anoxia are again clearly presented through physiologic principles, functions, and technics. Also covered are the fundamentals of circulation and respiration, blood and vascular changes in shock and burns, the alimentary system, water and salt balance and the significance of the loss of gastrointestinal secretions in various pathologic states, the endocrine glands, and physiology of the nervous system.

In his introduction to the First Edition Dr. Nash pointed out: "The surgeon is often unaware of the large amount of physiological knowledge which he continually applies in his daily work. Nevertheless, physiology is a constantly acting force guiding the work of the most avowedly 'practical' surgeon. Though all aspects of surgery involve physiology in some degree, in certain of the newer developments of surgery physiology is actually the predominant consideration, operations being directed to the relief of functional rather than structural disorders."

The surgeon, student, and intern will find this book a practical guide to "physiological knowledge."

CLINICAL ENDOCRINOLOGY. By Karl E. Paschkis, M.D., Associate Professor of Medicine, Assistant Professor of Physiology, Director of the Division of Endocrine and Cancer Research, Jefferson Medical College; Chief of Endocrine Clinic, Jefferson Medical College Hospital; Attending Endocrinologist, St. Christopher's Hospital for Children, Philadelphia, Pa.; Abraham E. Rakoff, M.D., Clinical Professor of Obstetric and Gynecologic Endocrinology, Jefferson Medical College; Endocrinologist to the Hospital Laboratories, Jefferson Medical College Hospital; Guest Lecturer in Gynecic Endocrinology, Department of Internal Medicine, Graduate School of Medicine, University of Pennsylvania, Philadelphia, Pa.; and Abraham Cantarow, M.D., Professor of Biochemistry, Jefferson Medical College; formerly Associate Professor of Medicine, Jefferson Medical College, and Assistant Physician, Jefferson Medical College Hospital, Philadelphia, Pa. Cloth. Pp. 830, with illustrations. Price $16.00. Paul B. Hoeber, Inc., 49 E. 33rd St., New York 16, 1954.

Thoroughly unified in text and concept, this book reflects the fusing of knowledge and talents of three men who are accustomed to working and teaching together. The individual authors' backgrounds in physiology, biochemistry, and clinical medicine are evident in their integrated account of the endocrine system, its relation to other body systems, and the diagnosis and treatment of its disorders. This spirit of cooperation stands out throughout the book. Commenting on the coming of age of clinical endocrinology as a valid specialty, the authors write, "It illustrates clearly the practical value of integrated studies by workers trained in the different disciplines of physiology, anatomy, biochemistry, organic chemistry, biology, pathology and clinical medicine."

Broad in scope, the twelve sections that make up the book cover the following topics: Anterior Pituitary, Posterior Pituitary, Thyroid, Adrenal Cortex, Adrenal Medulla, Ovaries, Placenta, Testes, Pancreas, Parathyroids, Obesity, and Methods and Materials. The undergraduate student will find the text convenient to study, as each gland is discussed in the familiar sequence of the medical curriculum: embryology, anatomy, histology, physiology, pathology, pathologic physiology, diagnosis, and treatment. For accurate diagnosis and proper treatment, the practicing physician will be interested in the authors' approaches to diagnosis, advice on effective therapy, and concise explanation of the reasoning behind the diagnostic procedures and therapeutic recommendations. The practical needs of the clinicians are served, as treatment is taken up specifically in every chapter for every syndrome discussed.

Throughout the book are original illustrations and photographs of patients with typical diseases. The forty-nine-page index should enable the reader to put his finger on the desired information quickly.

The book's value is correctly stated by the publishers: "More than an encyclopedia of facts, the authors have prepared a full-bodied textbook which offers an *understanding* of endocrine disorders. With it, the family physician can give his patients the most intelligent and successful care modern medicine can provide."

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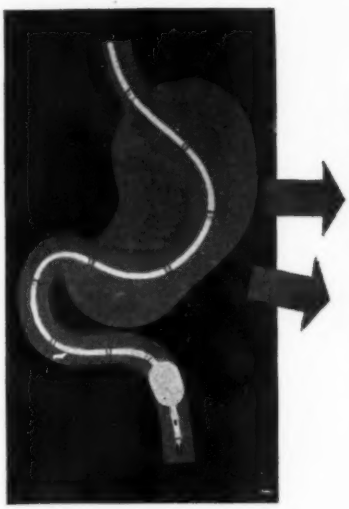

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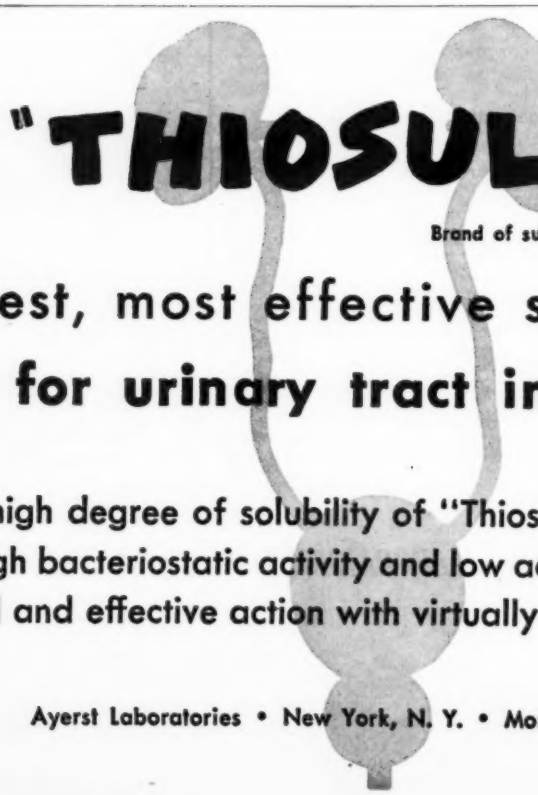

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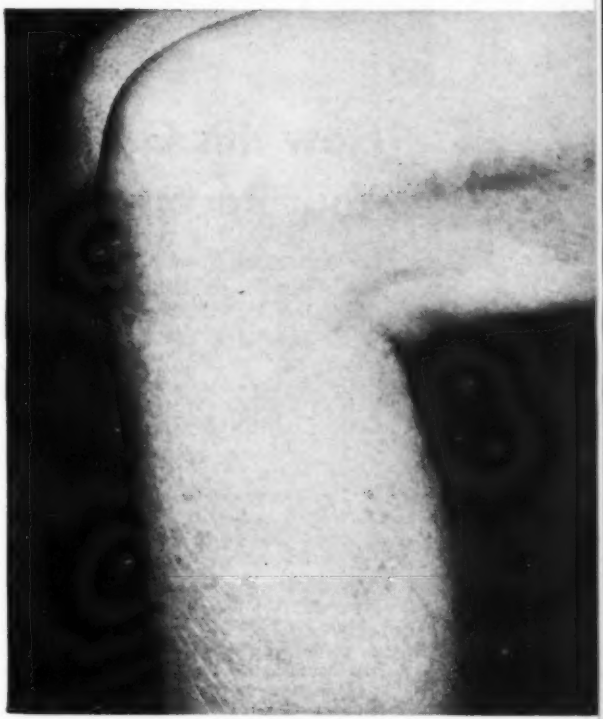

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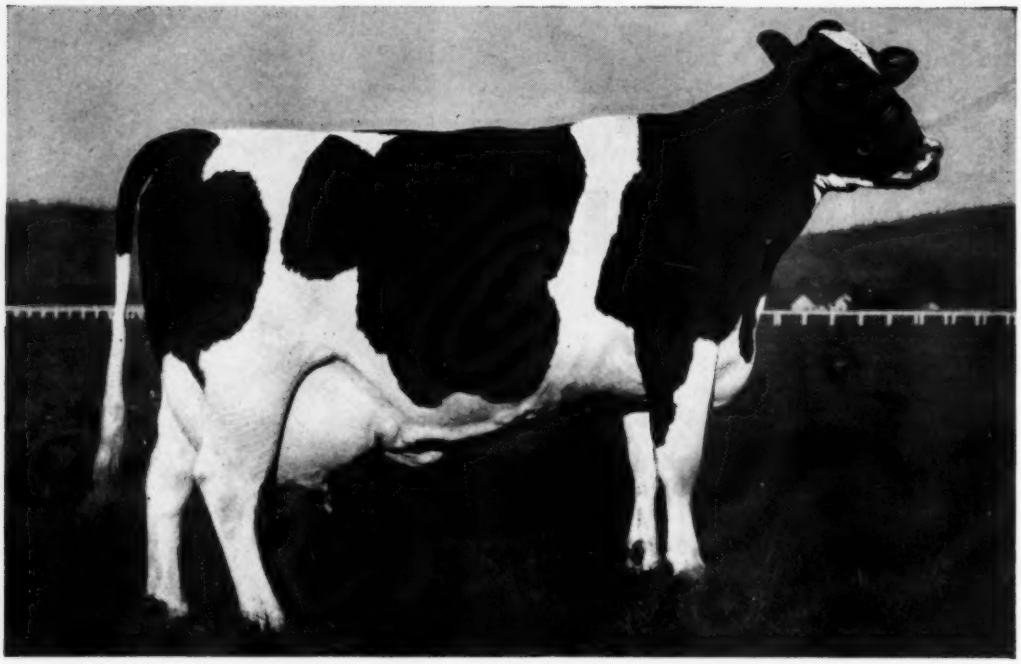

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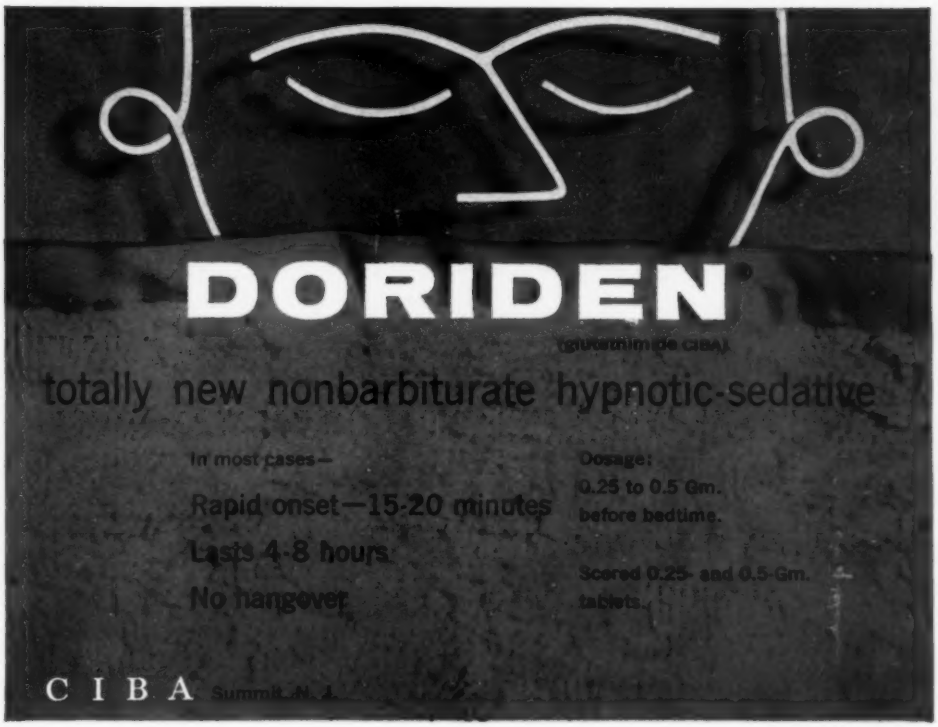

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ACE Rubber-Elastic Bandages (5½ yds. fully stretched) are supplied in 2", 2½", 3", 4" and 6" widths. Handy Roller, 2½" wide.

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ACE Bandages Are Made Only By

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ACE, TRADEMARK REG. U. S. PAT. OFF.

Priming the Pump

IF YOU are a young old timer you will perhaps recall the old iron pump in use down on grandpa's farm. Remember how it had to be primed before it worked on its own?

Most patients with functional constipation — even those who believe that nothing will help them but a harsh cathartic — require nothing more than a gentle priming action to "re-educate" a lazy colon grown dependent on irritating purgatives. Vitaminerals' newest product, VM. No. 31, has been designed to provide effective relief for chronic sufferers of functional constipation. Based on the principle of *co-ordinated laxation*, VM. No. 31 is actually two laxatives in one, each supplementing the other for maximum effectiveness. Each dosage comes sealed in cellophane, one half providing tablets of powdered plantago husks as the necessary bulk lubricant for muscular re-education, and the other half containing tablets with gentle rhubarb root to serve as the primer, or activator and provide 'trigger action" to prod the lazy colon into working on its own. Both active elements of this *co-ordinated laxative* contain only herbal and botanical ingredients.

VM. No. 31 is an entirely new concept in the treatment of functional constipation. It provides the doctor with effective patient control in that dosage is for two weeks, at the end of which time the patient returns for re-checking and additional therapy. The doctor is also able to vary the ratio between the herbal laxative and the bulk lubricant, according to the degree of obstinancy of the particular case.

Doctor, pick out the outstanding "cathartic slave" among your practice for VM. No. 31 therapy. We feel certain this product will find a permanent place in your practice.

VITAMINERALS INC.

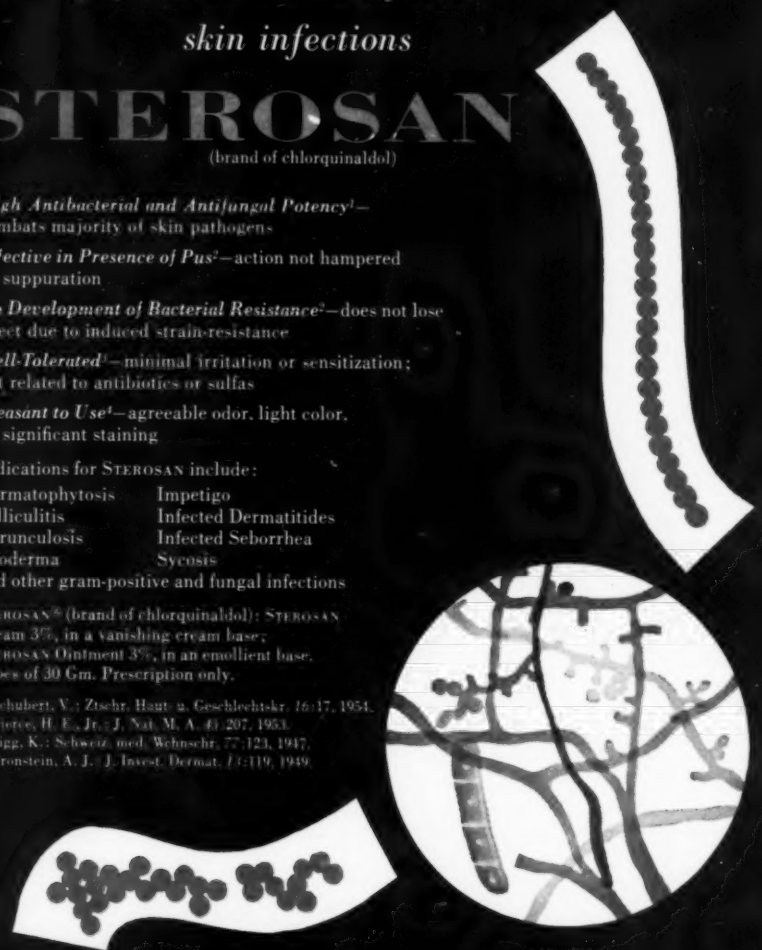
Glendale 1, California

new *iodine-free* *oxyquinoline*

for bacterial and mycotic skin infections

STEROSAN

(brand of chlorquinaldol)



High Antibacterial and Antifungal Potency[1]— combats majority of skin pathogens

Effective in Presence of Pus[2]—action not hampered by suppuration

No Development of Bacterial Resistance[3]—does not lose effect due to induced strain-resistance

Well-Tolerated[4]—minimal irritation or sensitization; not related to antibiotics or sulfas

Pleasant to Use[4]—agreeable odor, light color, no significant staining

Indications for STEROSAN include:

Dermatophytosis	Impetigo
Folliculitis	Infected Dermatitides
Furunculosis	Infected Seborrhea
Pyoderma	Sycosis

and other gram-positive and fungal infections

STEROSAN® (brand of chlorquinaldol): STEROSAN Cream 3%, in a vanishing cream base; STEROSAN Ointment 3%, in an emollient base. Tubes of 30 Gm. Prescription only.

1. Schubert, V.: Ztschr. Haut- u. Geschlechtskr. *16*:17, 1954.
2. Pierce, H. E., Jr.: J. Nat. M. A. *46*:207, 1953.
3. Sigg, K.: Schweiz. med. Wchnschr. *77*:123, 1947.
4. Tronstein, A. J.: J. Invest. Dermat. *13*:119, 1949.

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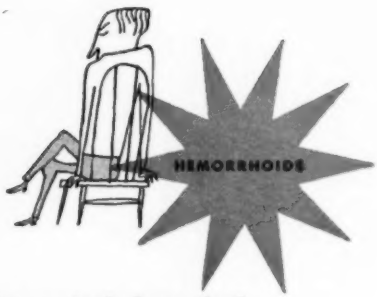

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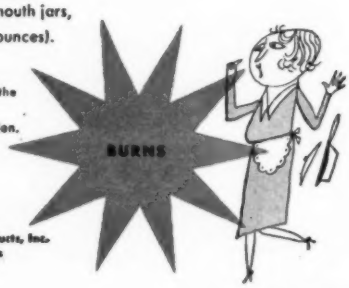
(Brand of lidocaine*)

a new form of the widely accepted Xylocaine Hydrochloride solution

- Xylocaine Ointment provides unusually rapid, and deeply penetrating anesthesia without the drawback of toxicity, sensitization or irritation. Xylocaine is unique in this respect.
- For use in the control of itching, burning and other dermatologic distress. May also be applied liberally on skin and accessible mucous membranes to prevent pain during examination or instrumentation.
- Available in a water soluble, nonstaining vehicle as 2.5% and 5% Xylocaine base in collapsible tubes or wide-mouth jars, each containing 35 grams (approx. 1.25 ounces).

Xylocaine Ointment is now made available at the request of many physicians, surgeons, and anesthetists who routinely use Xylocaine Solution.



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Conventions and Meetings

Announcements

American Osteopathic Association, Fifty-Ninth Annual Convention, College of Osteopathic Physicians and Surgeons and Biltmore and Statler Hotels, Los Angeles; Convention Instruction Courses, July 5-16; Convention Teaching Sessions, July 18-22. Program Chairman, W. Donald Baker, 3450 W. 43rd St., Los Angeles 8.

Academy of Applied Osteopathy, annual meeting, Statler Hotel, Los Angeles, July 22-23. Secretary, Margaret W. Barnes, Box 1345, Carmel, Calif. Program Cochairmen, Margaret H. Raffa, 5009 Central Ave., Tampa 3, Fla., and Paul K. Theobald, 1419 Broadway, Oakland 12, Calif.

American College of Osteopathic Surgeons, annual meeting, Hotel Statler, Washington, D. C., October 30-November 3. Administrative Secretary, Mrs. E. F. Martin, Box 474, Coral Gables 34, Fla. Program Chairman, Arthur M. Flack, 135 S. 17th St., Philadelphia 3.

American Osteopathic Academy of Orthopedics, annual meeting, Hotel Statler, Washington, D. C., October 29-November 2. Secretary, J. Paul Leonard, 2673 W. Grand Blvd., Detroit 8. Program Chairman, Karl P. B. Madsen, 460 Staten Ave., Oakland 10, Calif.

American Osteopathic College of Anesthesiologists, annual meeting, Hotel Statler, Washington, D. C., October 30-November 3. Secretary, Crawford M. Esterline, Box 155, Kirksville, Mo. Program Chairman, Harry J. Petri, Jr., 5 Deering St., Portland 3, Maine.

American Osteopathic College of Proctology: See American Osteopathic Society of Proctology.

American Osteopathic College of Radiology, annual meeting, Hotel Statler, Washington, D. C., October 30-November 3. Secretary, F. A. Turfler, Jr., South Bend Osteopathic Hospital, 118 S. William St., South Bend 2, Indiana. Program Chairman, A. G. Reed, 212 Pythian Bldg., Tulsa 3, Okla.

American Osteopathic Hospital Association, annual meeting, Hotel Statler, Washington, D. C., October 30-November 2. Executive Secretary, Mr. R. P. Chapman, 1013 Kahl Bldg., 326 W. Third St., Davenport, Iowa. Program Chairman, Mrs. Alixe P. Nuzum, Des Moines General Hospital, Des Moines, Iowa.

American Osteopathic Society of Proctology and American Osteopathic College of Proctology, annual clinical assembly, Bellevue-Stratford Hotel, Philadelphia, April 14-16. Secretary, Carl S. Stillman, Jr., 3523 Fifth Ave., San Diego 3, Calif. Program Chairman, Joseph W. Kenney, 718 Guaranty Bldg., Indianapolis 4.

Arizona, annual meeting, Paradise Inn, Phoenix, April 22-24. Secretary, H. E. Allshouse, 2243 N. 12th St., Phoenix 22. Program Chairman, Leonard Staff, Jr., 3 E. Seventh St., Tempe.

Arkansas, annual meeting, Albert Pike Hotel, Little Rock, May 12-13. Secretary, R. M. Packard, 409 Citizens Bank Bldg., Jonesboro. Program Chairman, L. E. O'Keefe, First State Bank Bldg., Springdale.

Canada, annual meeting, Mount Royal Hotel, Montreal, October 29-31. Secretary, Miss Joyce S. Currie, 609 Medical Arts Bldg., Montreal 25. Program Chairman, A. E. Wilkinson, 616 Medical Arts Bldg., Montreal 25.

Eastern Osteopathic Association, annual meeting, Hotel Statler, New York City, April 2-3. Secretary, Frank B. Tompkins, Baltimore Life Bldg., Baltimore 1. Program Chairman, Chester D. Losee, 212 Prospect St., Westfield, N. J.

Florida, annual meeting, Orange Court Hotel, Orlando, April 14-16. Secretary, Dominic Raffa, 5009 Central Ave., Tampa 3. Program Chairman, Charles C. Tindall, 119 Dakin Ave., Kissimmee.

Georgia, annual meeting, Bon Air Hotel, Augusta, April 29-30. Secretary, Walter B. Elliott, Jr., 702 Mortgage Guarantee Bldg., Atlanta 3. Program Chair-

...no two hypertensives are alike

A. C. can't get along without Rauvera
Diagnosis: Fixed Essential Hypertension, Grade III

A. C.: Male, Negro, 31. Blood pressure 225/145, pulse rate 110. Excited, headaches, dizziness. Got good but not optimal reductions with Rautensin after 7 weeks, was therefore put on *combination therapy*—Rauvera, 4 tablets daily at 4-hour intervals after meals. (Each tablet contains 1 mg. mixed purified Rauwolfia alkaloids—the alseroxylon fraction—and 3 mg. mixed Veratrum alkaloids—alkavervir.) This accomplished a prompt additional reduction of blood pressure to 125/80 and of pulse rate to 84. Dizziness, headaches and excitability disappeared.

Rauvera® is a DORSEY preparation. Supplied in bottles of 100, 500, and 1,000 tablets.

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A. C. can't get along without Rauvera...for no two hypertensives are alike.

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18%

The rapidly expanding routine use of Furadantin in acute and chronic urinary tract infections has enabled us to make an average reduction of 18% in the cost to your patients.

50 and 100 mg. tablets. Furadantin Oral Suspension, 5 mg. per cc.

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for true economy in urinary tract infections FURADANTIN®
brand of nitrofurantoin, Eaton

man, M. Lillian Bell, 2075 Ridgewood Drive, N. E., Atlanta 6.

Hawaii, annual meeting, Reef Hotel, Honolulu, July 25-27. Secretary, Joseph W. Stella, 38 Young Hotel Bldg., Honolulu 13. Program Chairman, C. W. Wyman, 417 National Bldg., Honolulu 13.

Illinois, annual meeting, Faust Hotel, Rockford, April 29-May 1. Executive Secretary, Mr. Douglas Durkin, 5200 S. Ellis Ave., Chicago 15. Program Chairman, E. C. Andrews, Ottawa Arthritis Hospital and Diagnostic Clinic, Ottawa.

Indiana, annual meeting, French Lick Springs Hotel, French Lick Springs, May 14-17. Secretary, Arabelle B. Wolf, 809-13 Odd Fellows Bldg., Indianapolis 4. Program Chairman, Paul van B. Allen, 1500 N. Delaware St., Indianapolis 2.

Iowa, annual meeting, Savery Hotel, Des Moines, May 23-24. Secretary, Mr. Dwight S. James, 200 Walnut Bldg., Des Moines 9. Program Chairman, Clive R. Ayers, Grant.

Kansas, annual meeting, Allis Hotel, Wichita, April 23-27. Executive Secretary, Mr. Lloyd L. Hall, Room 612, National Bank of Topeka Bldg., Topeka. Program Chairman, R. G. Waddill, 2914 E. Central, Wichita 6.

Kentucky, annual meeting, Brown Hotel, Louisville, October 12-13. Secretary, Harold D. Benteen, 2048 Winchester Ave., Ashland. Program Chairman, Henry P. Lawrence, Hawesville.

Maine, annual meeting, Samoset Hotel, Rockland, June 16-18. Program Chairman, Michael A. Longo, 142 Pine St., Bangor. Midyear meeting, Eastland Hotel, Portland, December 2-3. Secretary, Roswell P. Bates, 72 Main St., Orono.

Michigan, annual meeting, Civic Auditorium, Grand Rapids, October 3-5. Executive Secretary, Mr. Harve Lamont Smith, 81 Glendale, Highland Park 3. Program Chairman, Harold W. Laidlaw, McCoy-Laidlaw Clinic, Bad Axe.

Minnesota, annual meeting, Lowry Hotel, St. Paul, May 6-7. Secretary, E. R. Komarek, 301 Granite Exchange Bldg., St. Cloud. Program cochairmen, M. Sidney Hedeen, 1593 University Ave., St. Paul 4, and Brian F. Doherty, 925 New York Bldg., St. Paul 1.

Missouri, annual meeting, Continental Hotel and Municipal Auditorium, Kansas City, September 27-29. Executive Secretary, Mr. Paul D. Adams, 325 E. McCarty St., Jefferson City. Program Chairman, J. Edward Sommers, 6504A Delmar Blvd., St. Louis 5.

National Osteopathic Child's Health Conference and Clinic, Municipal Auditorium, Kansas City, Mo., April 4-6. Program Chairman, John C. Taylor, 3504 Troost Ave., Kansas City 3, Mo.

New Jersey, annual meeting, Ritz Carlton Hotel, Atlantic City, March 12-13. Executive Secretary, Mr. I. J. Tecker, 21 Hancock St., Riverside. Program Chairman, Mortimer J. Sullivan, 21 N. Mountain Ave., Montclair.

New Mexico, annual meeting, Alvarado Hotel, Albuquerque, May 19-21. Secretary, Robert E. Smith, 205 N. First St., Lovington. Program Chairman, R. K. Widney, Widney Clinic, 1020 Central Ave., S. W., Albuquerque.

New York, annual meeting, Hotel Statler, New York City, October 14-15. Secretary, Robert E. Cole, 417 S. Main St., Geneva. Program Chairman, Walter Streicker, 7 Plaza St., Brooklyn 17.

North Carolina, annual meeting, Battery Park Hotel, Asheville, October 20-22. Secretary and Program Chairman, S. Dales Foster, 710 Public Service Bldg., Asheville.

Northwest Osteopathic Convention, annual meeting, Portland, Ore., June 13-16. Program Chairman, Russell F. Kenaga, Sr., 2265 W. Burnside St., Portland 5.

Ohio, annual meeting, Neil House, Columbus, May 2-4. Executive Secretary, Mr. William S. Konold, 50 E. Broad St., Columbus 15. Program Chairman, Robert H. Gibson, 112 W. Third Ave., Columbus 1.

Oklahoma, annual meeting, Hotel Tulsa, Tulsa, November 8-10. Executive Secretary, Mr. Walter L. Gray, 210-12

Braniff Bldg., Oklahoma City. Program Chairman, Carl R. Samuels, S. Adair St., Box 44, Pryor.

Ontario, annual meeting, Empress Hotel, Peterborough, May 6-7. Secretary, A. V. DeJardine, 205 Yonge St., Toronto 1. Program Chairman, Reginald G. Martin, 124 Hunter St., W. Peterborough.

Oregon: See Northwest Osteopathic Convention.

Osteopathic College of Ophthalmology and Otorhinolaryngology, annual meeting, Continental Hotel, Kansas City, Mo., July 25-27. Executive Secretary, Mr. William S. Konold, 50 E. Broad St., Columbus 15, Ohio. Program Chairman, H. Mahlon Gehman, 1818 Pine St., Philadelphia 3.

Pennsylvania, annual meeting, Bellevue-Stratford Hotel, Philadelphia, September 30-October 2. Executive Secretary, Mr. George W. Thomas, 1941 Market St., Harrisburg. Program Chairman, George S. Esayian, 113 N. Ambler St., Quakertown.

South Dakota, annual meeting, Sylvan Lake Hotel, Black Hills, June 5-7. Secretary, E. W. Hewlett, 417 W. 27th St., Sioux Falls. Program Chairman, Laurence S. Betts, Box 205, Huron.

Tennessee, annual meeting, Maxwell House Hotel, Nashville, March 21-23. Secretary, J. M. Moore, Jr., 200 High St., Trenton. Program Chairman, Fred L. Mitchell, 516 James Bldg., Chattanooga 2.

Texas, annual meeting, Rice Hotel, Houston, May 12-14. Executive Secretary, Phil R. Russell, 512 Bailey St., Fort Worth 7. Program Chairman, J. Natcher Stewart, Stevens Park Osteopathic Hospital, 1141 N. Hampton Road, Dallas 11.

Vermont, annual meeting, Long Trail Lodge, Mendon Mt., Rutland, September 28-29. Clerk, Howard I. Slocum, Battell Block, Middlebury. Program Chairman, Hermon K. Sherburne, Jr., Mead Bldg., Rutland.

Virginia, annual meeting, The Lodge, Williamsburg, May 27-28. Acting Secretary, Harold A. Blood, 228 N. Columbus St., Alexandria. Program Chairman, Vincent H. Ober, 407-11 Bankers Trust Bldg., Norfolk 10.

Washington, midyear meeting, Washington Athletic Club, Seattle, December 3-4. Secretary, Eugene E. LaCroix, 1747 S. Sheridan Ave., Tacoma 5. Program Chairman, Erskine H. Burton, 710 Jones Bldg., Tacoma 2.

West Virginia, annual meeting, McClure Hotel, Wheeling, June 4-7. Secretary, Guy E. Morris, 542 Empire Bank Bldg., Clarksburg. Program Chairman, Joseph B. C. Bartram, Gilmer Clinic, Post Office Bldg., Glenville.

Wisconsin, annual meeting, Hotel Pfister, Milwaukee, April 18-20. Secretary, Edwin J. Elton, 1518 N. 70th St., Wauwatosa 13. Program Chairman, Paul A. Allen, 6 S. Mill St., Waupun.

. . . no two hypertensives are alike

B. D. needs Rautensin
Diagnosis: Hypertension, Grade II, labile

B.D.: Female, white, 62. Average blood pressure 220/115, pulse: 95. Irritable, sleeps poorly. Placed on twice average dose of Rautensin—4 tablets per day in two doses, after luncheon and at bedtime. Each tablet contains 2 mg. of purified Rauwolfia alkaloids—alseroxylon fraction. After 12 weeks the gradual reduction of her readings reached satisfactory levels. Blood pressure 155/90, pulse rate 80. She now sleeps well, is no longer irritable; she occasionally takes an extra cup of coffee if the sedative effect is too pronounced. No postural hypotension encountered.

Rautensin* is a DORSEY preparation. Supplied in bottles of 100, 500, and 1,000 tablets.

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*TRADE MARK

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State and National Boards

ARIZONA

Those interested in professional examinations should contact Russell Peterson, D.O., secretary, Osteopathic Board of Registration and Examination in Medicine and Surgery, 2747 East McDowell Road, Phoenix.

Basic science examinations June 21 at the University of Arizona, Tucson. Applications must be filed 2 weeks prior to the examination. Address Herbert D. Rhodes, Ph.D., secretary, Basic Science Board, University of Arizona, Tucson.

COLORADO

Professional examinations in June in Denver. Applications must be filed 30 days prior to the examination. Address Samuel H. Brown, M.D., executive secretary, Board of Medical Examiners, 831 Republic Bldg., Denver 2.

Basic science examinations May 4-5 in the Lecture Room, second floor, Y.M.C.A. Bldg., E. 16th Ave. and Lincoln St., Denver. Applications must be filed by April 20. Address Esther B. Starks, D.O., secretary, Basic Science Board, 1459 Ogden St., Denver 18.

Dr. Starks has been re-elected secretary-treasurer of the Board.

CONNECTICUT

The officers of the Osteopathic Examining Board are: President, Nestor Hotchkiss, Norwalk; secretary, Frank Poglitsch, New Britain; and treasurer, James T. Berry, Hartford, who has re-

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We thank you, doctor, for prescribing Trevidal. Most of you who have employed this new, balanced protective antacid have continued to use it routinely. For those of you who have not yet had a chance to evaluate the unique antacid activity of Trevidal, may we suggest you write us today for a clinical trial supply.

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EACH TABLET CONTAINS:

Unique vegetable mucin supplies protective coat to irritated stomach lining → Regonol*‡ . . . . . 100 mg.

Balance of ingredients avoids constipation, diarrhea, or alkalosis →
Magnesium trisilicate . . . . . 150 mg.
Aluminum hydroxide gel . . . . 90 mg.
Calcium carbonate . . . . . 105 mg.
Magnesium carbonate . . . . . 60 mg.

Binder controls and extends antacid activity → Egraine†‡ . . . . . 45 mg.

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*Cyamopsis tetragonoloba gum †Protein binder from oat ‡Trade Marks

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cently been appointed to the Board for a term of 5 years.

Basic science examinations June 11. Applications must be filed 2 weeks prior to the examination. Address Miss M. G. Reynolds, executive assistant, Board of Healing Arts, 52 Whitney Ave., New Haven.

DISTRICT OF COLUMBIA

Professional examinations May 9-10. Address Mr. Paul Foley, Deputy Director, Department of Occupations and Professions, 1740 Massachusetts Ave., N.W., Washington 6.

Basic science examinations in April. Address Mr. Foley.

FLORIDA

Professional examinations in June. Address R. Philip Coker, D.O., secretary, Board of Osteopathic Medical Examiners, Box 66, Panama City.

Basic science examinations in June. Address M. W. Emmel, D.V.M., secretary, Board of Examiners in the Basic Sciences, P. O. Box 340, Gainesville.

IDAHO

Examinations June 9 at Boise. Address D. W. Hughes, D.O., secretary, Board of Osteopathic Examiners, 203 Sun Bldg., Boise.

ILLINOIS

Examinations in April in Chicago. Address Mr. Frederic B. Selcke, Superintendent of Registration, Department of Registration and Education, State House, Springfield.

IOWA

Basic science examinations April 12 at the Capitol Bldg., Des Moines. Address Ben H. Peterson, Ph.D., secretary, Board of Basic Science Examiners, Coe College, Cedar Rapids.

KANSAS

Examinations in June at Topeka. Address Forrest H. Kendall, D.O., secretary, Board of Osteopathic Examination and Registration, 420½ Pennsylvania Ave., Holton.

LOUISIANA

The officers of the Board of Osteopathy are: President, M. R. Higgins, Lafayette; secretary, Carl E. Warden, Lake Charles; and treasurer, Walter T. Colquitt, Shreveport. All were re-elected.

MAINE

Examinations June 8-9 at Augusta. Address George Frederick Noel, D.O., secretary, Board of Osteopathic Examination and Registration, Monument Square, Dover-Foxcroft.

MARYLAND

Examinations in June. Address Christopher L. Ginn, D.O., secretary, Board of Osteopathic Examiners, 419 No. Charles St., Baltimore 1.

MICHIGAN

The new officers of the Board of Osteopathic Registration and Examination are: President, I. L. O'Connor, Detroit; vice president, Willis H. Yeamans, Mt. Clemens; and secretary, Charles J. Manby, Battle Creek.

Basic science examinations May 14-15 at Detroit and Ann Arbor. Address Mrs. Anne Baker, secretary, Board of Examiners in the Basic Sciences, 116 Mason Bldg., Lansing.

MINNESOTA

Basic science examinations April 5-6 at the University of Minnesota, Minneapolis. Applications must be filed by March 10. Address Raymond N. Bieter, M.D., secretary, 105 Millard Hall, University of Minnesota, Minneapolis 14.

MISSISSIPPI

Examinations in June. Address R. N. Whitfield, M.D., assistant secretary, Board of Health, Jackson.

NEBRASKA

The officers of the Osteopathic Board of Examiners are: President, Orville D. Ellis, Lincoln; vice president, R. H. Cowger, Hastings; and secretary C. Eugene Brown, Nebraska City. Dr. Brown was appointed to replace George P. Taylor, whose term expired November 30, 1954.

Basic science examinations May 3-4. Address Mr. Husted K. Watson, Director, Bureau of Examining Boards, Department of Health, State Capitol Bldg., Lincoln 9.

NEVADA

Basic science examinations April 5. Address Donald G. Clooney, Ph.D., secretary, Board of Examiners in the Basic Sciences, Box 9005, University Station, Reno.

NEW MEXICO

Basic science examinations April 17. Address Mrs. Marguerite Cantrell, secretary, Board of Examiners in the Basic Sciences, P. O. Box 1522, Santa Fe.

OHIO

Examinations June 13-15 at Men's Gymnasium, Ohio State University, Columbus. Address H. M. Platter, M.D.,

secretary, Medical Board, 21 W. Broad St., Columbus 15.

OKLAHOMA

Basic science examinations April 7-8 at the University of Oklahoma School of Medicine. Applications must be filed 10 days prior to examination. Address Secretary of State, State Capitol Bldg., Oklahoma City.

ONTARIO

The officers of the Board of Directors of Osteopathy are: Chairman, Douglas Firth, Toronto; vice chairman, J. Edwin Wilson, Barrie; and secretary-treasurer, D. G. A. Campbell, Toronto. Dr. Wilson was appointed to the Board to replace J. R. G. McVity.

RHODE ISLAND

Professional examinations April 7-8. Address Mr. Thomas B. Casey, Administrator of Professional Regulation, 366 State Office Bldg., Providence.

Basic science examinations in Room 366, State Office Bldg., Providence, May 18. Applications must be filed approximately 20 days prior to examination. Address Mr. Casey.

SOUTH DAKOTA

Basic science examinations first week in June. Address Gregg M. Evans, Ph.D., secretary, Basic Science Board, 310 E. 15th St., Yankton.

TENNESSEE

Examinations in February and July at Nashville. Applications must be filed 15 days prior to examination. Address M. E. Coy, D.O., secretary, Board of Examination and Registration for Osteopathic Physicians, 1226 Highland, Jackson.

VERMONT

Examinations in June. Address Charles D. Beale, D.O., secretary, Board of Osteopathic Examination and Registration, Mead Bldg., Rutland.

WISCONSIN

Basic science examinations May 14 at the Hotel Schroeder, Milwaukee. Applications must be filed by May 6. Address Prof. William H. Barber, secretary, Board of Examiners in the Basic Sciences, 621 Ransom Ave., Ripon.

WYOMING

Examinations June 6 at Cheyenne. Address Franklin D. Yoder, M.D., secretary, Board of Medical Examiners, New State Office Bldg., Cheyenne.

F. E. does best on Crystoserpine
Diagnosis: Hypertension, Grade III, fixed

F. E.: Male, white, 39. Blood pressure 210/130, pulse rate 84. Agitated, neurotic. Given Crystoserpine (crystalline reserpine) 0.5 mg. q.i.d. After 24 weeks of therapy the gradual and steady hypotensive action of Crystoserpine produced an excellent response: blood pressure dropped to 120/75, pulse rate to 64. The tranquillizing effects of Crystoserpine changed F. E.'s personality from an agitated, neurotic patient to a cheerful, calm individual who can take the pressure of his work in stride.

Crystoserpine* is a DORSEY preparation. Available as 0.25 mg. and 1.0 mg. tablets in bottles of 100, 500, and 1,000 tablets.

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REREGISTRATION OF OSTEOPATHIC LICENSES

April 1—Montana, $2.00 for those in active practice; $1.00 for those inactive. Address Asa Willard, D.O., secretary, Board of Osteopathic Examiners, Wilma Bldg., Missoula.

April 1—Wyoming, $2.50. Address Franklin D. Yoder, M.D., secretary, Board of Medical Examiners, New State Office Bldg., Cheyenne.

May 1—Iowa, $1.00. Address Mr. Dwight S. James, assistant secretary, Board of Osteopathic Examiners, 200 Walnut Bldg., Des Moines 9.

May 1—Washington, $2.00. Address Mr. Edward C. Dohm, secretary, Professional Division, Department of Licenses, Olympia.

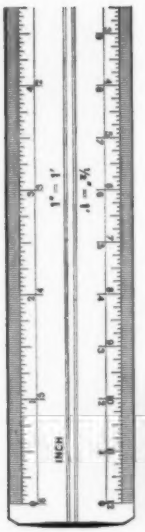
During June—Hawaii, $5.00 for residents, $2.00 for nonresidents. Address Frank O. Gladding, D.O., secretary, Board of Osteopathic Examiners, 504 Kauikeolani Bldg., Honolulu 13.

EXAMINATION OF NATIONAL BOARD

The National Board of Examiners for Osteopathic Physicians and Surgeons conducts Parts I and II of its examination on the first Thursday and Friday of each May and December at the six approved colleges. Application blanks may be obtained from the secretary or the dean of the college, and the completed application blank, together with a passport photograph and check for the parts to be taken, must be in the secretary's office by the November 1 or April 1 preceding the examination.

Examinations in Part I consist of anatomy, including histology and embryology; physiology; physiological chemistry; general pathology; and bacteriology, including parasitology and immunology.

Part II consists of examinations in surgery, including applied anatomy, surgical pathology, and surgical specialties; obstetrics and gynecology; pediatrics; neurology and psychiatry; public health, including hygiene, medical jurisprudence;



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SURGICAL BLADES

and by any measure it is just as true today as when our Company was founded . . . in the purchase of B-P RIB-BACK SURGICAL BLADES you are provided with the most dependable cutting edges that modern scientific methods and *the art of accuracy* can produce . . . their performance in use is the answer to the question of economy!

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BARD-PARKER COMPANY, INC.
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Part III examinations will be given at the College of Osteopathic Physicians and Surgeons, Los Angeles, March 5-6, at the Chicago College of Osteopathy, Chicago, April 3-4, and in the Spring at Philadelphia and Kirksville, Mo.

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Application must be filed with the secretary of the Board not less than 30 days prior to the examination dates. Address Paul van B. Allen, D.O., secretary, 1512 N. Delaware Street, Indianapolis 2, Indiana.

WHEN CHILDREN ARE BORN WITH DEFECTS*

Victoria Shannon
Medical Social Worker, Division of Crippled Children,
Connecticut State Department of Health

Most of us who are engaged in health and welfare services have seen families which include a child with a congenital defect. We have seen the parents burdened with the extra tasks that caring for such a child demands and even more with the conflicting feelings they have about themselves and their child. We have wondered how they reacted to the child's birth. Could professional people have been more helpful? Can we learn to be of more help in the future?

To stimulate thought about helping parents in the period shortly after the birth of a child with a congenital defect, the Connecticut Branch of the American Association of Medical Social Workers sponsored a panel on the subject at its annual meeting held in conjunction with the 1954 meeting of the Connecticut State Medical Society. While problems of adjustment occur from the child's birth throughout life, the panel concentrated on ways of helping parents in the shock of their first knowledge of their child's anomaly. Since the most effective help to the child and his parents comes when physicians, social workers, and nurses work together, representatives of these three professions were each invited to contribute to the discussion.

Because of her studies of patients, the social worker in a prenatal clinic usually has knowledge of value to the physician considering how to help the parents. She may know the answers to such questions as: How did the parents feel about each other at the time of pregnancy? Has the marriage abounded in hostilities? Have the parents been accepted by their in-laws? Have the parents had to struggle with feelings of guilt over sexual activity or over their reaction to the pregnancy? Have cultural differences enriched their marriage or complicated their adjustment? Do they use religion as a source of support or a threat of punishment? Are there environmental difficulties which could be lessened? She has learned these answers in her efforts to build a relationship which may help support the woman not only during pregnancy but also after delivery.

*Reprinted from *Children*, January-February, 1955.

The support given to the expectant mother by the nurse during pregnancy and good nursing care at the time of hospitalization are important in any pregnancy. The warmth of a good nurse can add much to a mother's feeling of confidence in her own abilities as a mother. This comes from both public-health nurse and clinic or bedside nurse. In addition nurses increasingly are becoming aware of the emotional implications of the patient's behavior and of the effects of personal problems on the patient's health and are bringing this understanding to bear in their handling of their patients.

The physician is the professional person of most importance to expectant parents. A significant part of his medical care is the reassurance that everything is going well or being watched and that he will be making the delivery safe. Since he appears as one who instills courage and strength he often engenders the kind of positive feelings formerly reserved for the husband.

Many physicians have found that most pregnant women have a suppressed fear of giving birth to a defective child. When this actually happens, "fantasy and reality appear to meet."[1]

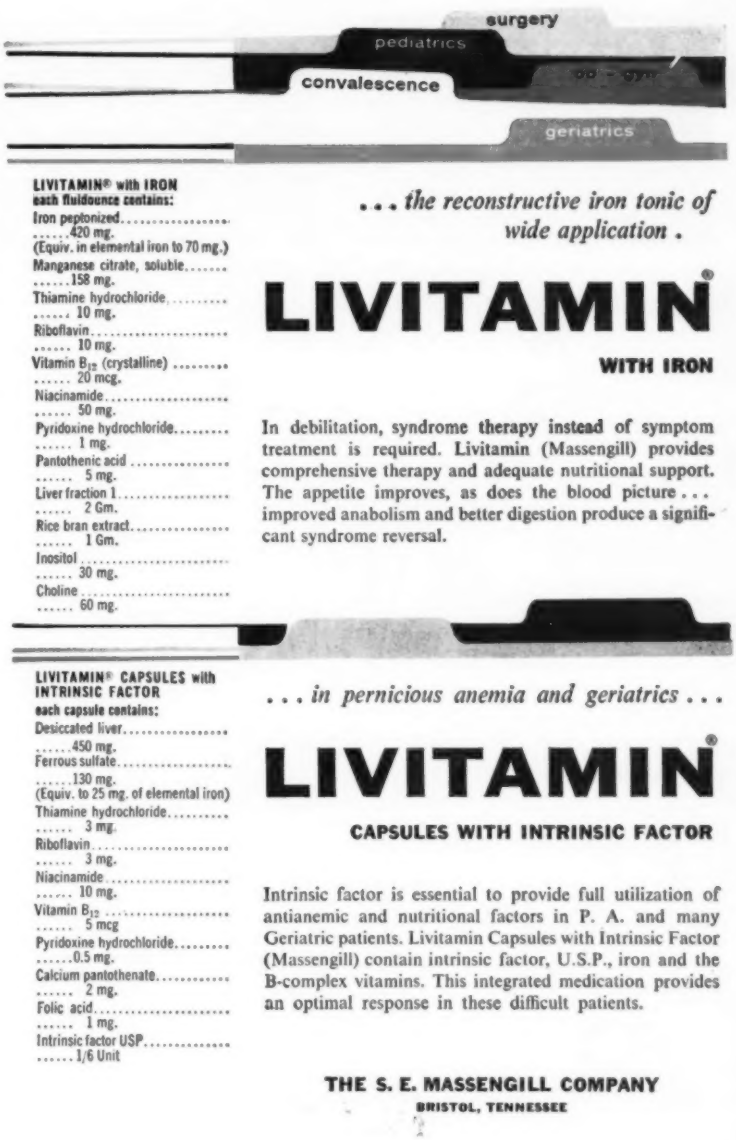
The discussion of how the hospital team might help to lessen the nightmarish quality of this experience opened with a summary of a case known to the State division of crippled children. The baby, Jane, had a variety of congenital defects which made her anything but a picture baby. She received surgery in the general hospital shortly after birth and again at 4 months. She remained in the same hospital till she was 7 months old and was then transferred to an orthopedic hospital for children.

The mother was discharged at about the usual time after delivery. She rarely visited Jane either at the general hospital or at the orthopedic hospital. "I was so knocked out by the baby's condition that I hadn't the strength to get out of bed," she told the medical social worker when the family was referred to the division of crippled children.

This mother had been ill at home for over a month after her discharge from the hospital. Her upsetting experience was intensified by the attitude of her own and her husband's parents, her own refusing to see the baby and her husband's saying that she should not have had a child because she was too young to know how to take care of a baby.

Nevertheless Jane's mother was at this time in the fifth month of her second pregnancy and was terrified at the possibility of the coming baby being like her first. She hated to go to sleep because she always dreamed of deformed babies. All this came out after she had bombarded the social worker with questions about Jane—"How big is my baby? Does she sit up? How much does she weigh?"

[1]Mushatt, Cecil, M.D.: Multi-Discipline Services in an Obstetric Clinic, paper presented at the 1954 Forum of National Conference of Social Work.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Both the mother and father received enough emotional support from the social worker to become able to visit Jane and to move toward feeling themselves to be more loving parents and, therefore, better persons. In addition, they were relieved of the financial obligation they had incurred for Jane's care, even though they had not been able to see how they would meet it. Pressure for payment of overdue bills had aggravated the difficulty these parents had had in visiting their baby.

MOTHERS' FEARS

After this case was reviewed the obstetrician pointed out that at the moment of birth a mother often fears that her child will be dead, injured, or defective. A mother may express this fear by asking, "Does it have all its fingers and toes?" Knowledge of a defect should not be kept from a mother when she asks, "How is my baby? Is he alive?" If the mother is to continue to trust the doctor, she should receive a frank answer. If she is told that the child is normal at this time her difficulty in eventually accepting the truth about her child's condition will be greatly increased. She may even insist that the defective child cannot possibly be hers. Learning that she was given false reassurance in the delivery room may provoke such resentment in both herself and her husband that neither may be able to establish good relationships with physicians in the future.

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faces three immediate decisions: whether to tell the mother about the anomaly, to show it to her, and to discuss its prognosis. The panel obstetrician advised that in such a situation the mother must be told both about the anomaly and its degree of severity and should be shown the child unless it is greatly disfigured.

A more difficult decision, he said, is what to do if the anomaly is major and disfiguring. Usually the father wants to help. The mother's desire to see or not to see the child should be respected. Often the nature of the defect is less severe in reality than in the mother's imagination. Its prognosis should be discussed in general, leaving details in the hands of the appropriate specialist or a pediatrician.

The physician may find it very hard to tell the parents about a defect. The panel moderator mentioned how, as a young instructor, he had to force himself as well as the resident physicians to face this painful task. Some physicians may be especially reluctant to discuss the possibilities of mental retardation. Nevertheless in cases of brain damage it is unfair to the parents to let them continue to have false expectations, the moderator said.

The panel members questioned whether efforts to conceal the existence of a defect would always be successful. One told of a mother of low intelligence who said of her child: "I knew something was wrong. Nobody smiled or said anything; and he was blue, not like my other babies."

Another mother had been told only that her baby boy, who had a cleft lip, was alive. She had not been allowed to see him for 2 months while he recovered from surgery. Later when the child was 10 years old she told a social worker that at the time of his birth she had overheard people whisper the word "hare." Concluding that her baby was completely covered with a thick growth of *hair* she had refused to see him when she was at last given the opportunity to just before he was placed in a boarding home. The decision to place the child outside the home had been made by her family physician and her husband without consulting her. Her delay in seeing her baby and her exclusion from all planning had fixed in this mother the belief that her child was a monster.

Experience with mothers of infants with cleft lip has shown that they appreciate the skill of the physician more fully if allowed to see their children before surgery. More important, seeing the baby at once helps the mother accept him as an individual personality.

THE NURSE'S ROLE

The nurse pointed out that in dealing with a newborn child it is essential for all nurses coming in contact with the patient and family to know:

Whether the family knows the child is not perfect.

What information the physician has given the family.

How much information the physician wishes the nurse to discuss with the family.

Whether immediate corrective surgery is planned or whether correction will be postponed and for how long.

Old wives' tales often help to aggravate disturbed feelings—particularly a sense of guilt about her own responsibility for the defect. Nevertheless, she may hesitate or forget to ask her physician about the validity of what she has heard from her neighbors or elsewhere. The nurse has an opportunity to develop close rapport and learn some of the mother's concerns—sometimes these come out only while the mother is caring for or feeding her child. The nurse can reassure the mother and work with her and with the social worker and physician in planning ways of helping both mother and child.

Anxious parents frequently misinterpret a physician's remarks or cling only to the encouraging ones, so that they fail to face the facts. The nurse, who may be seeing the child and parent more frequently than either physician or social worker, is in a position by her own acceptance of the baby to help the parents to accept their child's limitations.

If the child is to undergo surgery the nurse should know what the physician has told the family concerning the operation, how many stages are involved, and what the possible complications may be. A reassuring experience for the family at this point may be to see a child who has had successful surgery for a similar condition, for example, cleft-lip

repair or a heart operation. In the post-operative stage the nurse may help to reduce parents' fears concerning their child's condition when oxygen tents and other equipment unduly frighten them.

THE PEDIATRICIAN

During the discussion, the pediatrician pointed out that a pediatrician if chosen before delivery can be of help to the obstetrician and the parents when the latter are informed of their child's defect. However, he warned against too much initiative on the part of the professional staff in urging the mother to see the baby. Emphasizing the importance of proceeding very slowly with parents, who naturally need time to learn gradually to accept their baby's abnormality and to become relaxed in the face of it, he pointed to the need for patience in dealing with them.

"We can be most helpful," he said, "by letting the parents talk about the child's handicaps, and how it affects them personally and as a family, how hard it is to feed the baby, how difficult it is to answer other children's questions, how they haven't been able to go out. These everyday problems are all important. As the parents relate these experiences and their feelings about them to the doctor, they learn that he is interested in them as well as in their child."

Each family must be understood individually by the pediatrician, who must see them regularly and plan his care in terms of months and years rather than in days and weeks.

"The parents are quick to notice impatience on the part of their doctor," the pediatrician added. "When they feel that they are being rushed, they cannot be free and comfortable in discussing the problems, nor can they work towards making definite plans for the care of the infant."

Only when the parents realize that the pediatrician accepts them with all their mixed feelings and attitudes about their child, will they be comfortable with him. When they are, he may be the person with whom they will raise the question of whether they dare have another child —especially if they have any feeling that the obstetrician may have been at fault.

FUTURE PREGNANCIES

The question "What about having other children?" is always asked sooner or later. When another child is on the way the mother and the father of a defective child will be seeking reassurance that misfortune will not strike again. In such instances, said the panel obstetrician, the obstetrician consulted must know about the parents' past experience in as great detail as possible, with particular emphasis on the manner in which the parents were handled by the medical personnel in attendance, what they have been told about the etiology and prognosis of the defect, and what their reaction has been to it. Only with these facts in mind and with a careful appraisal of the parents, based on close questioning, can he do his best to help with the parents' emotional problems. While there is some increased incidence of abortion, prematurity, and congenital defects in subsequent pregnancies among individuals who have had a congenitally defective child, it is not so great as to prevent an obstetrician from honestly expressing considerable optimism regarding the outcome of another pregnancy. "Such reassurance is extremely important," the obstetrician maintained.

Another case discussed involved the mother of a boy with a serious cardiac malformation. When her baby was about 3 months old, this woman had said, "It isn't fair for any baby to have so much trouble," and was very emphatic about never wanting another child. Two years later she became pregnant again. When she first talked to the clinic social worker, she was feeling very guilty about not wanting another child and had postponed talking to her husband and relatives or making any plan for obstetrical care. She said that her former physician had been very critical of her reaction to the birth of her boy, including her desire not to have another baby. Nevertheless she was thinking of going back to him again in spite of her resentment—perhaps to punish herself.

When the social worker helped her think of alternatives that would be more satisfying, her self-confidence increased and she was able to discuss with her husband some of her feelings. Together husband and wife worked out plans for

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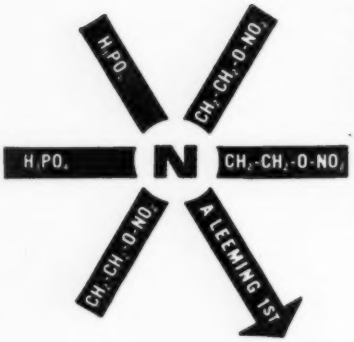

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medical care and took other steps to make everything about this pregnancy as different as possible from the previous one. However, this mother is still far more anxious than she was before she had a child with a defect and will continue to need the support of the pediatric clinic team even though her next baby is normal.

The obstetrician introduced another problem:

During pregnancy clinical signs and X-ray examination or both may disclose some weeks before term the presence of a major anomaly, especially hydrocephalus or anencephalus, gross malformations of the head and brain. This puts the obstetrician in a position of either deliberately concealing this knowledge from the parents, or of divulging the information to one or both of them. Frequently he handles the situation by informing the father about the anomaly, perhaps with the recommendation that it is up to him to decide whether or not to inform his wife. The obstetrician and the father may thus become partners in deliberately concealing the truth from the mother, a fact which may later be resented by the mother and have far-reaching repercussions. The father's emotions in relation to such a deception ought to be considered as well as how this will affect the wife's future feelings about her husband, the obstetrician said.

"On the other hand," the obstetrician added, "the mental state of the mother who knows that she is carrying a defective child is unfortunate and may possibly be reflected in difficulties in the further course of pregnancy or labor, depending on her personality and her deep feelings concerning childbearing, as well as on her past experience. We do not have in this situation the favorable maternal psychology which makes acceptance of knowledge of congenital anomaly relatively simple in the actual delivery setting."

The responsibilities imposed on the physician by foreknowledge of a defect are tremendous. The obstetrician cited a case in which a young husband was told of an expected hydrocephalic child. The father became greatly disturbed and told his mother. Promptly all the relatives became involved, each family blaming the other.

Sufficient knowledge about the family, the marriage, and the couple's feelings about the pregnancy might help the physician decide when and with whom he would talk. Such information would probably be known to the social worker or in some situations to a public-health nurse or to a medical student or physician who had had the time necessary to get such information and had learned how to use it.

The social workers suggested that a father told of an expected anomaly might gain emotional support from being able to talk over his problem with a social worker. The latter might help him to express his real feelings about whether to share this knowledge with the mother. A social worker might also help the father to realize how his handling of this crisis might affect the marriage. This clarification of the husband's feelings could be brought to the physician and used by him as a basis for further joint planning.

At this point in the discussion the pediatrician suggested that perhaps it was unfair for the obstetrician to unload his prebirth knowledge of defectiveness onto either parent before delivery. "There is too much emotional adjustment at stake to put the whole burden of knowledge on the father alone," he said. The pediatrician and obstetrician agreed that this whole area needs much further study.

THE SOCIAL WORKER

In discussing the making of long-term plans for families with defective children, the panel members maintained that the feelings and wishes of the family must be respected and that the parents should be the ones to consider the various ways of caring for their child. For example, advice to have a child placed in an institution may be disastrous to the parents if they are not ready to accept it.

Many parents have guilt feelings about having produced an imperfect child. Through the casework relationship the social worker often can help the parents to change their feelings about them-

selves so that they no longer blame themselves for their child's condition. Conflict between parents and among relatives over the child can then be reduced.

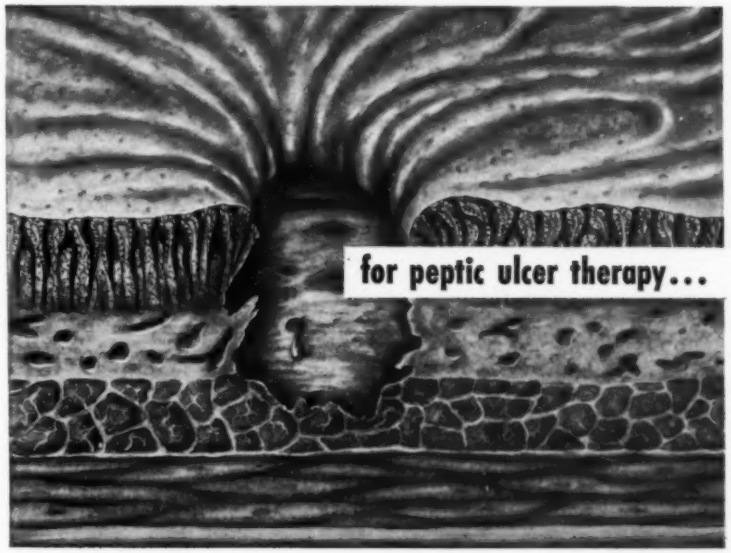
The same questions and problems may crop up again and again before real understanding and acceptance of the child are achieved. Some parents may need help in raising questions, such as whether their first reaction to the pregnancy affected the development of the fetus, or in asking about their child's prognosis or whether they should have other children. The social worker and other members of the professional team may also facilitate cooperative relationships among the various hospitals or clinics that may be involved in the case.

In some instances the pediatrician or family physician may have the interest, time, and skills to help the parents with their planning. Because of the length of time involved, and the complexity and cost of the services required, many physicians refer their patients to the local unit of the State division of crippled children, where the child can receive coordinated care from a team of medical specialists, nurses, social workers, and speech, occupational and physical therapists. Other private, voluntary, or tax-supported resources are drawn in on the patient's behalf.

Frequent communication between the various professional persons involved is essential in working with families of children with congenital anomalies. For example, if the child has cerebral palsy many persons will have different services and points of view to offer—all needed by the patient at one period or another. If the family is to participate there must be such close working together of the professional people that the family will see unity in approach and goals, even with variety of personnel and method. Spending time in a case conference can save time by increasing the effectiveness of work with the patient.

As the professional personnel involved we also need to learn much more about our own feelings concerning parenthood, the processes of pregnancy and childbirth, persons with defects—and how these feelings affect our work. We need to learn much more about the meaning of these experiences to other people so that we can understand different parents' reactions to them.

In our daily work with expectant parents, we need to make use of our opportunities to help build their confidence and move toward more effective adulthood. When a child is born with a defect we need to accept his parents' feelings, and to realize the individuality in each situation. We must assist such parents from the beginning in understanding what is involved in their child's treatment and prognosis—that several operations at different periods of a child's life may be needed, that training of a special sort may diminish a handicap, that help can be given them in relation to their own feelings. In short, we need to use our professional skills with the greatest understanding of which we are capable.



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FURTHER DECREASE IN MARRIAGE RATE*

There were about 1,484,000 marriages in the United States during 1954, or 60,000 fewer than in the preceding year. The marriage rate in 1954 was 9.1 per 1,000 population (including the Armed Forces overseas), a decline of 6 percent from the rate of 9.7 per 1,000 recorded in 1953. Except for a moderate upswing following the outbreak of hostilities in Korea during 1950, the marriage rate has continued downward since reaching its all-time peak of 16.2 per 1,000 in 1946.

During 1954 the marriage rate fell below that of 1953 in every month except February and November, when the rates for the two years were practically the same. In consequence, the monthly marriage rates for the country are now at, or close to, their lowest levels in two decades. Nor is there much likelihood of any appreciable upswing until after 1960; by that time an increasing number of young people will be attaining marriageable age, reflecting the upward trend in births during the 1940's.

Most areas of the country reported fewer marriages during the first 10 months of 1954 (the latest available figures) than in the comparable period of 1953. However, in only eight States did the decline exceed 10 percent. Such was the case in Vermont, Ohio, Delaware, Maryland, New Mexico, Utah, Oregon, and Arkansas. The decrease in marriages was most pronounced in the last-named State as a result of legislation requiring

*Reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Company, December, 1954.

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1. Overall, J. C.: Southern M. J. 47:789, 1954. 2. Editorial: New England J. M. 246:111, 1952. 3. Grayzel, H. G., Heimer, C. B., and Grayzel R. W.: New York St. J. M. 53:2233, 1953. 4. Heimer, C. B., Grayzel, H. G., and Kramer, B.: Archives of Pediatrics 68:382, 1951. 5. Behrman, H. T., Combes, F. C., Bobroff, A., and Leviticus, R.: Ind. Med. & Surg. 18:512, 1949. 6. Turell, R.: New York St. J. M. 50:2282, 1950.

a premarital serological test after June 30, 1953. In fact, during the first six months of 1954, marriages in Arkansas were off by almost three fifths from their level in the comparable period of 1953; the decline was much smaller, however, in the second half of the year.

In contrast to the general decline in marriages in our country, nine States recorded small increases during 1954. The largest gain—4 per cent—was recorded in Florida. In the other eight States, all located in the Central and Mountain areas, the increases amounted to 2 per cent or less.

The major urban centers of the country showed similar variations. In cities with at least 100,000 population considered as a group, there were 4.7 per cent fewer marriages in the first 10 months of 1954 than in the corresponding period of 1953. Ninety-one, or about nine tenths of these urban centers, recorded decreases; in 12 there were increases. In only one of these large cities, namely, Little Rock, Ark., did the increase in marriages exceed 10 per cent. This is particularly noteworthy in view of the marked decline in marriages in the rest of the State.

Of the five largest cities, Los Angeles alone showed an increase in marriages as compared with 1953, but the rise there amounted to only 1 per cent. In New York City the number of marriages decreased from 71,942 in 1953 to about 70,160 in 1954, or by 2½ per cent. In Philadelphia the decline was considerably greater, namely, 6 per cent.

The country's popular marriage centers also showed a general downward trend. For example, Reno recorded a decrease of almost 10 per cent, and in Elkton, marriages were off by 6 per cent. In Miami, however, marriages increased by 1½ per cent between 1953 and 1954.

MILK SANITATION, COMMUNICABLE DISEASE, AND PUBLIC HEALTH*

By James H. Steele, D.V.M., M.P.H.†

Milk sanitation began to exert an influence on communicable disease control and public health near the close of the 19th century, some years after the first outbreak of milkborne disease was recorded. With the development of the sciences of epidemiology and bacteriology, some of the early public health observers and investigators had begun to suspect, on the basis of their epidemiological findings, that milk might be a vehicle of infection. The isolation of the microbic causes of tuberculosis, typhoid fever, and Malta fever laid the basis of milk sanitation, which was to develop rapidly thereafter. The finding of the diphtheria, streptococcus, and staphylococcus organisms in milk emphasized the necessity for improving milk sanitation.

In spite of some resistance to the theory of epidemiology, within a few years of the isolation of many of these organisms it was widely accepted that tuberculosis, typhoid fever, diphtheria, and streptococcal diseases, including sore throat and scarlet fever, were often spread by contaminated milk.

By 1900 the way was clear for the development of a scientific public health program along two major lines, namely, communicable disease and sanitation. The health menace involved in the use of a milk supply could then be determined by precise bacteriological procedures, and the need for pasteurization could be proved. These bacteriological methods and knowledge could also be applied to other foods and to water, sewage, and the environment. The diagnosis of communicable diseases of man and animals could be confirmed. Sanitation now had a scientific basis for control of diseases which are spread by direct contact between man and man, and between man and animals.

In 1909, the Public Health Service issued Hygienic Laboratory Bulletin 56 *(1)*, which listed 500 outbreaks of milkborne diseases in various parts of the world between 1857 and 1907. However,

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*Reprinted from *Public Health Reports*, November, 1954.

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the 500 outbreaks represented only the few that had appeared in the literature. According to this report, the first recorded summary of epidemics of diseases spread by milk was prepared by Ernest Hart of England in 1881. Hart cited 50 epidemics of typhoid fever, 15 epidemics of scarlet fever, and 4 epidemics of diphtheria. The first cases of typhoid fever shown to be due to contaminated milk occurred at Penrith in Great Britain in 1857. A decade later the first published report of scarlet fever traced to an infected milk supply came from this same community. In 1877, diphtheria was added to the list of milkborne diseases when it was described in Surrey, England. Shortly thereafter there were many similar reports from Western Europe and North America.

In 1947, the Public Health Service published a list of epidemics of milkborne diseases which occurred between 1923 and 1945 *(2)*. The 955 outbreaks during this period included 40,177 cases of sickness and 804 deaths caused by infected milk. There were 440 outbreaks of typhoid fever (7,449 cases), 27 of paratyphoid (1,063 cases), 202 of scarlet fever (19,190 cases), 18 of diphtheria (324 cases), 20 of dysentery (1,413 cases), 196 of food poisoning and gastroenteritis (9,780 cases), 34 of brucellosis (275 cases), and 18 outbreaks of miscellaneous diseases (683 cases).

The 34 reported brucellosis outbreaks were only a small fraction of the total that occurred during that period *(2)*. It is conservatively estimated that one-third of the brucellosis cases were due to the ingestion of infectious milk or milk products and that the remainder were due to occupational exposure.

Even though the number of cases of bovine-type tuberculosis in man was never more than a small percentage of the total cases of tuberculosis, its elimination and control was one of the first major advances in the reduction of tuberculosis in man. Less than 30 years ago extrapulmonary tuberculosis of bovine origin was common in any American community. Today it is an unknown disease among children in the United States.

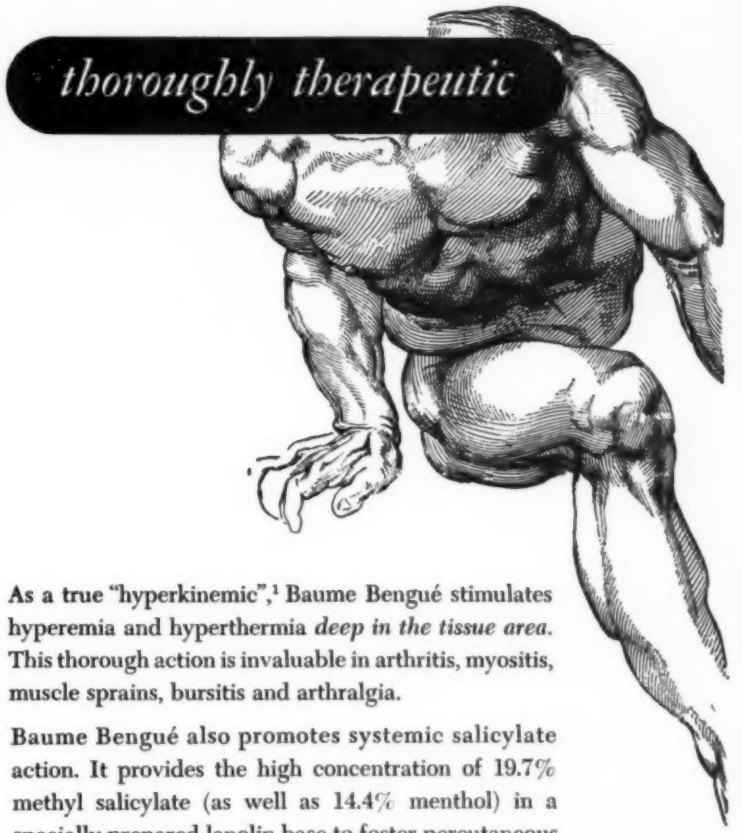
During the last decade of the period 1923-45, the case rate for many of the milk-borne diseases dropped rapidly. Dauer *(3)* states that in 1952 comparatively few of the disease outbreaks reported were traced to milk or milk products.

TUBERCULOSIS

From a world viewpoint, of the diseases of the cow which are transmissible to man, the most important economically and from the public health standpoint is tuberculosis. For many years most public health workers believed that bovine tuberculosis in man was a disease only of ingestion which produced an extrapulmonary form of disease. Sigurdsson *(4)*, with the publication of a study made in rural Denmark, further supported the concept previously developed by Griffith *(5)* and Lange *(6)* that bovine-type tuberculosis was not only a disease of ingestion of infectious milk, but that it was spread by contact with infected animals which caused pulmonary disease in man. In his study, Sigurdsson typed the organism recovered from 566 cases of pulmonary tuberculosis in human beings, 165 of them from rural areas. Of the rural patients, 67 (40.6 percent) were infected with *Mycobacterium tuberculosis* bovine type, whereas only 15 (3.6 percent) of the urban patients had this type of infection.

Following up the source of infection of the rural cases, Sigurdsson found that 94 percent of those with bovine-type tuberculosis had been in contact with infected cattle within the past 2 years. Living *Myco. tuberculosis* organisms were found in the dust and dirt of the stables. The importance of the shedding of these organisms in bovine feces had been recognized for 50 years but only in connection with external contamination of milk and not as a source of pathogens for airborne infections. Sigurdsson's study is significant in that it demonstrated the danger to man from contact with infected animals, quite apart from the well-known and long-appreciated danger arising from the ingestion of infected milk. Meyer (7) has repeatedly pointed out that *Myco. tuberculosis* bovine type is just as virulent for man as the human type—perhaps even more so.

The importance of bovine tuberculosis as a disease of ingestion is illustrated by the following episodes. In 1948, Ohio Department of Agriculture veterinarians



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1. Lange, K., and Weiner, D.: J. Invest. Dermat. 12:263 (May) 1949.

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found tuberculosis reactors in a large herd of milking cows when they tested the herd by interdermal inoculation of tuberculin. The infected animals were sent to an abattoir where they were slaughtered and post-mortem examination was carried out. Most of the reactors showed gross lesions of tuberculosis. Investigation by the health authorities revealed that raw milk from this herd had been used in the community, including the local elementary school. A survey was made of the children in this school. The majority reacted positively to the Mantoux skin test, although many of them had been examined only 2 years before and most were negative at that time. A number of children, including one child on the farm where the infected cows were located, developed enlarged cervical lymph nodes.

Since the report of this episode, only 5 cases of bovine-type tuberculosis have been found in man in the United States. Three of the patients were elderly persons hospitalized for other reasons; the fourth was a young housewife who had spent her entire life in the city; and the fifth was a war bride who had been in the United States less than a year when the infection was discovered. She had the pulmonary type of the disease.

The influence of pasteurization on the prevalence of bovine-type tuberculosis in children was dramatically illustrated by Price (*8*) in Toronto, where pasteurization is compulsory. He demonstrated that no bovine tuberculosis was seen among persons in the city, whereas 15 percent of the tuberculosis in children living in the surrounding rural areas was of the bovine type. Blacklock (*9*) relates a similar experience in Glasgow, where the milk is also pasteurized. He states that the mortality from tuberculosis meningitis of the bovine type is less than one-quarter of the rate in rural areas of the western counties from which Glasgow draws its milk supplies, and that the morbidity rate in "surgical tuberculosis" due to bovine infection is one-fifth of the rate in rural areas. Reilly (*10*) states that the decrease in tuberculosis of the bovine type in Northern Ireland must be due to the increased use of pasteurization. In 1939 only 7 percent of the milk was pasteurized. At the end of 1949, the amount of heat-treated and grade A milk had increased to 90 percent.

Human-Type Tuberculosis in Cattle

It is important to emphasize in public health practice that the control of bovine tuberculosis is also dependent on the prevention of contact between noninfected animals and persons with open infections. In the late 1920's, veterinarians in Finland called attention to the fact that persons with open lesions of pulmonary tuberculosis may spread their infection to cattle. In cattle, a high incidence of positive tuberculin reactors with few or no anatomical lesions occurs as a result of such exposure. Although the human type of tuberculosis does not become clinical in cattle, it introduces a factor of uncertainty into the interpretation of tuberculin tests.

During the past two decades, there have been reports of human-type tuberculosis infection of cattle in various parts of the world, usually among animals on farms where tuberculous employees were in contact with them. Human-type tuberculosis causes cattle to react to the tuberculin test but does not produce generalized disease. Unfortunately, man can be a carrier of bovine-type tubercle bacilli which can cause serious generalized tuberculosis outbreaks among cattle. Such carriers may account for some of the unexplained sporadic outbreaks of tuberculosis in cattle in disease-free herds. The control of tuberculosis in man is important to good animal health, and the elimination of the bovine type of tuberculosis infection in man is dependent upon eradication of the disease in animals.

First Organized Public Health Function

Recognition that human tuberculosis of the bovine type could be controlled by animal testing and milk pasteurization was the basis of many of the early milk sanitation programs, and these procedures were the first efforts by many communities to control tuberculosis in man. Shortly after the turn of the century, when raw milk was widely used, cities began promulgating milk ordinances that required the testing of all cows for tuberculosis. This led to the development of milk sanitation and inspection

activities which were based on the certified milk program practices. In many instances the milk sanitation program was the first organized public health function. Shortly thereafter, some cities began organizing full-time health departments to control communicable disease and improve sanitation.

The first certified milk program in the United States was organized in 1893 in Essex County, N. J. This program was under the direction of the local medical society, which set certain standards as to the fat content and bacterial count of milk, the tuberculin testing of cows, and dairy sanitation. The actual amount of certified milk sold was small, but the certified dairies set an example and furnished a model for the dairy industry.

It was evident from the early experience of the certified milk commissions that clean milk could be obtained but that maintaining the safety and wholesomeness of the milk presented a different problem. Experience of the past 50 years has shown that the complete exclusion of diseased animals from dairy herds is an ideal seldom achieved. There are always some cows with mastitis or other infections of public health significance. The danger of milk contamination by human beings is always present. The organisms causing tuberculosis, septic sore throat, typhoid fever, diphtheria, scarlet fever, and other human disease can readily contaminate any milk supply. When this was realized, it became evident that the only safe milk is milk which is kept physically clean and then made safe by pasteurization.

With the rapid development of pasteurization, tuberculin testing of cows lagged in some areas of the United States, but during the decade 1920-30 many cities adopted tuberculosis testing even for milk that was to be pasteurized. The demand by the large cities that milk be from tuberculosis-free cows was one of the major reasons for the success of the national bovine tuberculosis eradication program in the United States.

BRUCELLOSIS

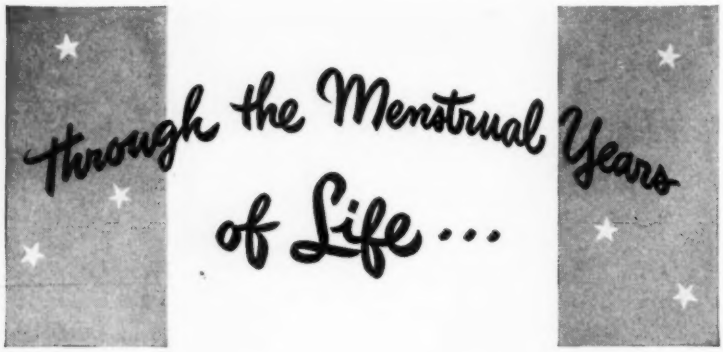
Brucellosis was first described on the island of Malta in 1861 and was called "Mediterranean fever" or "recurrent gastric fever." Its etiological agent was discovered by Bruce in 1887, but it was not until 1905 that it was reported as a milkborne disease, contracted by the ingestion of raw milk from goats infected with brucellosis. *Brucella abortus* was first described by Bang in 1898. In 1911, Schroeder and Cotton (*11*) suggested the possibility that *B. abortus* was pathogenic for man and urged the pasteurization of milk to prevent brucellosis. In 1918, Alice Evans reported that *Bacterium melitense* was difficult to distinguish from *Bacterium abortus* and that these two organisms might be related (*12*). Shortly thereafter, Meyer and Shaw proposed the generic term *Brucella* for *Micrococcus melitensis, Bacillus abortus,* and *Bacillus suis. Brucella suis* was not isolated from cows' milk until about 1929, and the first sizable epidemic occurred in Iowa soon after that date. In the 1930's, Taylor and his associates (*13*) reported outbreaks of brucellosis in southern France attributed to *Brucella melitensis* from cows' milk.

BRUCELLOSIS CASES REPORTED IN THE UNITED STATES, 1927-52

Year	Number of cases	Year	Number of cases
1927	112	1940	3,310
1928	669	1941	3,484
1929	975	1942	3,228
1930	1,435	1943	3,734
1931	1,578	1944	4,386
1932	1,502	1945	4,959
1933	1,788	1946	5,887
1934	2,017	1947	6,147
1935	2,008	1948	4,991
1936	2,095	1949	4,235
1937	2,675	1950	3,510
1938	4,379	1951	3,139
1939	3,501	1952	3,116

Beginning in 1927, when brucellosis was made a reportable disease in the United States, and continuing through 1947, there was a constant increase in reported cases, but after 1947 a precipitous decrease occurred (see table). From a study of brucellosis incidence in the United States in 1949, Steele and Emik (*14*) concluded that there were 10,709 estimated cases that year as compared to 4,235 cases officially reported. It is believed that the reporting of the disease is no more complete today than it was in 1949.

The greatest increase in brucellosis cases was reported between 1938 and



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1947, a period which parallels the increase in domestic animal population and in the prevalence of animal brucellosis. During this same period, there was an expansion of the dairy industry, accompanied by an increased use of pasteurization, and the reported incidence of urban cases declined. Inasmuch as most of the urban cases were usually attributed to the ingestion of contaminated dairy products, it is quite apparent that pasteurization was making itself felt, although it should be remembered that the diagnostic criteria were at the same time becoming much more critical, a factor which would tend to eliminate some cases that previously would have been diagnosed as brucellosis.

After 1948, the use of pasteurized dairy products increased very rapidly in urban, rural, and resort areas. In addition, some areas were beginning to require that all fluid milk, whether to be pasteurized or to be distributed to the consumer in the raw state, be from herds that were free of brucellosis or were under some kind of control plan. In 1950, Illinois adopted requirements that by 1955 all grade A milk, whether pasteurized or not, must be from herds that are free of brucellosis. This action had a very stimulating effect on the neighboring States supplying Illinois with milk, and they immediately took steps to expand their State control programs. Since 1950, a number of other States and large cities have adopted similar requirements. The 1953 recommendations of the Public Health Service Milk Ordinance and Code (*15*) state that "within 3 years at the most after the adoption of this ordinance, all milk and milk products for pasteurization shall be from herds qualified by the State Livestock Sanitary Authority as following plan A or plan B approved by the Bureau of Animal Industry for the eradication of brucellosis." This action is very similar to the adoption of compulsory tuberculosis testing of milk cows 25 or 30 years ago. The effect will be far reaching, and within a decade the prevalence of bovine and human brucellosis will be reduced even further. It may be that in another decade, local milk regulations will require that all types of domestic animals on farms where milk is produced be free of brucellosis.

Q FEVER

Q fever was first described in 1937 among abattoir workers in Brisbane, Australia. It was not considered an important disease until 1944, when outbreaks of atypical pneumonia among Allied and Axis troops in Italy and Greece were identified as Q fever. Since then it has been found in many countries of Europe, North Africa, and the Middle East, and in the United States. The principal sources of human infection are now known to be cattle, sheep, and goats. All of these animals, though apparently well, may excrete the organism in the feces, urine, milk, placenta, and fetal membranes. Man is probably infected either by inhaling dust contaminated with these excreta or by drinking contaminated milk. Bell and his associates (*16*) pointed out that the infection rates among persons who used raw milk were 10 times higher than the rates among those who used only pasteurized milk.

The organism of Q fever is remarkably hardy, and the usual temperature used in pasteurization of milk is not adequate for its complete destruction. It also resists many disinfectants and can persist in dust for long periods. In a study of 66 cases in England (*17*), it was found that 26 patients drank unpasteurized milk. A study of the milk supply of 20 of these revealed that *Coxiella burnetii* was present in the milk supplied to 10 patients, and that the milk received by 4 other patients was from herds with serologic evidence of Q fever. The remaining 6 patients received raw milk in which there was no evidence of infection. Many of the 26 persons who drank raw milk also lived on farms, which made it difficult to determine the cause of infection, but in 13 cases there was no obvious source of infection other than the milk supply.

To date, little progress has been made in the control or prevention of Q fever in endemic or enzootic areas. Some promising results on the use of vaccines in cattle are under study in the western part of the United States. Most communities that are concerned with Q fever as a public health problem turn to pas-

teurization as one means of control. As stated earlier, pasteurization may not always destroy all the organisms present, but it does render the milk less infective and is probably reducing the hazard to man of milk naturally infected with the Q fever organism. So far as can be determined at this time, there is no evidence that pasteurized milk has produced the disease in man. There are no recommended public health practices for dealing with the problem other than pasteurization, but with the continued research in North America and Europe new control techniques should evolve.

OTHER ANIMAL DISEASE PROBLEMS

Anthrax, salmonellosis, streptococcal and staphylococcal mastitis, torulosis, and foot-and-mouth disease have all been described by various authors as milkborne diseases. In many instances, milk sanitation practices have influenced the course of control of these diseases. With the possible exception of anthrax, most of these problems can be handled by good milk sanitation practices, including pasteurization. Fortunately, nature helps with the problem of anthrax by reducing or cutting off lactation. There are no reports of milkborne or meatborne anthrax in the United States, according to available information (*18*).

Salmonellosis infections in cattle are not rare, but the pasteurization of milk is an effective procedure in preventing transmission of the infection to man.

Streptococcal and staphylococcal mastitis in cows is a common problem throughout most of the world, but except for the strains of the organisms that are toxin producers, they do not threaten human health if milk is properly pasteurized. The toxins formed by some strains of streptococcus and staphylococcus will survive pasteurization. These toxins produce vomiting and prostration of short duration, but the dilution effect of the milk probably prevents most food poisoning of this type in man.

Torulosis, or cryptococcosis, is a rare infection in man and even more rare in cattle. A mycotic infection primarily of man, it involves the central nervous system. It also produces meningitis, skin lesions, and pneumonic symptoms. In cattle, the symptoms are many and varied, but the most important from a public health point of view is mastitis. Inasmuch as the source of the disease in man is unknown, the outbreaks reported in dairy herds have been studied as to their public health hazard. Thus far no human infection has been found associated with infected dairy herds. *Cryptococcus neoformans*, the causal agent, can readily be isolated from the milk of affected cows and it is readily destroyed by pasteurization (*19*).

Foot-and-mouth disease causes infection in man only under rare circumstances. The early medical and public health literature carried many reports of its spread by milk, but in recent years no conclusive reports have appeared. If the virus should appear in milk, it would be destroyed by pasteurization.

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PASTEURIZATION

Pasteurization is one of the most far-reaching sanitary practices that has been introduced into public health. The process was first applied to wine by Pasteur less than 100 years ago to prevent souring and abnormal fermentation. The first practical application of heat treatment of milk was made by Franz von Soxhlet in 1886 when he systematized and popularized the idea of sterilizing the milk for use by infants. Germany and Denmark were the first countries to accept this principle. In America, the heat treatment of milk was described by Abraham Jacobi as early as 1873 and reiterated in 1889 after von Soxhlet published his recommendation. In 1895, a Danish pasteurizing machine was introduced into this country with the assistance of Nathan Straus. During the next decade, Rosenau, Parker, and Theobald Smith advanced the cause of pasteurization (*21*).

The pasteurization time and temperature necessary to insure a safe milk are calculated from the thermal death curve of the tubercle bacillus, *Myco. tubercu-*

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losis. At the time pasteurization was introduced, this organism was considered to be the most resistant pathogen found in milk, and the temperature and time used in pasteurization ranged from 138° F. (59.1° C.) for 20 minutes to 160° F. (70.9° C.) for 20 seconds. Later, in controlled experiments, it was found that the size of the inoculum may cause some variation in the time and temperature necessary to destroy the bacterium. For many years, the recommended pasteurization temperature was 143° F. (61.4° C.) for 30 minutes or 161° F. (71.6° C.) for 15 seconds. In recent years these temperatures have been increased, especially as cream lines became less of a competitive factor and the practice of homogenization came into use. This upward revision has also been influenced by the observation of investigators in England and California that *C. burnetii* was not always destroyed by the above recommended pasteurization temperatures. Enright (*22*) has pointed out that *C. burnetii* will survive 143° F. when 10,000 infectious guinea pig doses are present in 1 cc. of milk. There is no survival when the temperature is raised to 145° F. (62.7° C.) for 30 minutes. If the inoculum is increased above the 10,000 guinea pig doses per 1 cc. of milk, it is possible that some *C. burnetii* organisms may survive 145° F. (62.7° C.). Inasmuch as no naturally infected milk has been found which contained more than 10,000 infectious guinea pig doses, the survival of high population is only of theoretical interest. Investigations are being pursued in regard to the survival time and temperature of other viruses and bacteria in milk.

As early as 1892, Sedgwick, Batchelder, and Strauss were advocating the adoption of general pasteurization (*21*), but about 50 years of public health education were required to win over its many opponents, including physicians and veterinarians. World War II had a sizable influence on the acceptance of pasteurization in rural communities in the United States. Even during and after the war, however, there were those who argued that pasteurization was inefficient, that it put a premium on carelessness in milk production, and that it would injure the food value of the milk. It is now estimated that more than 85 percent of the market fluid milk consumed in the United States is pasteurized. In many rural areas, the milk hauler who picks up raw milk also delivers bottled pasteurized milk.

The dramatic disappearance of Pott's disease (tuberculosis of the vertebrae), the precipitous drop in human brucellosis in urban populations, and the decline of other milkborne human diseases, including typhoid fever, summer diarrhea, diphtheria, and streptococcal infections, are self-evident. Pasteurization cannot take credit for all of the decline of those diseases among men, but it has been a sizable factor and in some cases the most important single public health practice. What the full extent of pasteurization may be is not readily answered. In an address before the 1953 meeting of the Southern Branch of the American Public Health Association, Dr. Haven Emerson stated:

"Surely the first and most important contribution to the prevention of acute rheumatic fever and the deaths from valvular heart disease was not the wonderful resource of chemical and antibiotic bacteriostats and bacteriacides, but that wide sweeping enforcement of pasteurization of milk which first made a frontal attack on streptococcal throat infections.

"Without claiming credit for what belongs to the alert and intensive practice of preventive pediatrics and to the general reduction in family outbreaks of hemolytic streptococcus, or claiming that the health officer is responsible for the much milder scarlet fever now common north and south, we must note the not accidental coincidence of a falling acute rheumatic fever death rate among persons under 30 years of age with the consistent enforcement of pasteurization of milk in our large urban populations.

"The better we do our basic sanitation and communicable disease control, the less will internists, cardiologists, and chest surgeons have to do with the heart complications of middle age and later."

It is probable that the overall influence of pasteurization will not be felt for years to come, until there is an opportunity to study a population that has used only pasteurized milk.

SANITATION PRACTICES

To be effective, licensure must be followed up with adequate inspection, and inspection of the premises and practices of all licensed milk dealers and producers is the basis of any milk control program. However, the influence of routine inspection over many years is not readily ascertained. Most milk ordinances require that all milk-producing farms be visited by an inspector at least every 6 months, and once every 3 months or more often is recommended if changes and corrections are being made.

Milk plants and dairies should be checked regularly, and inspections should be made of the water supply, toilets, sewage and manure disposal, and cleanliness of barns, cowyard, milkhouse, utensils, animals, and man. Compliance with sanitary requirements for these items has probably been one of the most constructive steps in rural sanitation and has had a profound influence on public health in rural areas. This is attested to by the installation of running water septic tanks, and water heaters in rural homes on dairy farms where some of these items are required.

SUMMARY

One of the chief problems of milk sanitation is the zoonoses which are transmissible to man by contact with milk cows and through milk and milk products. The methods of prevention are: (*a*) animal disease control, (*b*) pasteurization, and (*c*) sanitation. To provide maximum protection of the public against the hazards of milkborne diseases, all of these must be fundamental requirements of any milk sanitation program.

The control of animal diseases can be described as biological control, whereas pasteurization and sanitation constitute physical control. Prevention of animal diseases has a far-reaching effect in that it also prevents occupational disease on the farm and in animal handling industries, increases milk production, and stabilizes animal industry. Pasteurization prevents the transmission of disease by means of milk, but it should not be the only line of protection. Sanitation, especially milk sanitation, is an essential part of any communicable disease control program. When these public health practices are successfully coordinated, a communicable disease control program which has depth as well as practicability results.

The promotion of milk sanitation and communicable disease control is a responsibility of all public health workers, but the veterinarian has the greatest responsibility because of his knowledge of the interrelation of the diseases of man and animal, and their economic and sociologic effects. The coordination of animal disease control and public health practices will result in a more efficient program that will advance public health and human welfare throughout the world.

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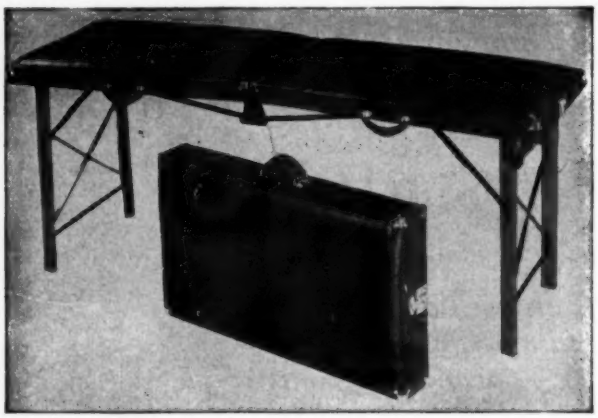

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GAS POISONING HAZARDS*

Although considerable progress has been made in reducing mortality from accidental gas poisoning, this cause still takes an annual toll of approximately 1,400 lives in the United States, or nearly 1 per 100,000 population. Almost three quarters of these deaths occur in the fall and winter months. The number of fatalities usually starts to rise in October, when home heating facilities begin to be used, and reaches its peak in December; thereafter the seasonal curve falls until it reaches its lowest level in the summer.

Males record a higher death rate from accidental gas poisoning than females, as is evident from the experience among Industrial policyholders of the Metropolitan Life Insurance Company during the years 1951-1953. The average death rate for males at ages 1-74 was 1.1 per 100,000, compared with .5 for females. Throughout the greater part of adult life, the rate for males was about four times that for females.

In this insurance experience, three out of every four deaths from accidental gas poisoning took place in and about the home. Gas ranges or gas heaters were involved in more than half of these fatalities. A common cause of such accidents was the turning on of jets in these appliances but not lighting them. This came about in various ways: by persons brushing against the jet; by someone turning on the gas and failing to light it because of lack of familiarity with the range or because of faulty memory; by young children turning on jets. Incomplete combustion in gas stoves or gas heaters in poorly ventilated rooms accounted for one eighth of the deaths in and about the home. About as many deaths were caused by leaky connections or other defects of gas cooking and heating appliances. It is noteworthy that home gas refrigerators were involved in only four fatalities. Altogether, illuminating gas in one way or another was responsible for fully two thirds of all the deaths from gas poisoning in and about the home.

Running an automobile motor in a household garage accounted for 46 fatalities in this study, most of them males. A considerable proportion of these men were working on cars in a closed garage while others were foolish enough, under similar conditions, to run the motor of their cars to keep warm.

Carbon monoxide produced by coal furnaces and stoves also contributed materially to the death toll from gas poisoning in and about the home, taking 16 lives in this insurance experience. Kerosene appliances were responsible for an additional 10 deaths. Three policyholders were asphyxiated by smoldering fires which were started by careless smoking of cigarettes or pipes in bed or in a chair.

There were 90 deaths from accidental gas poisoning in places other than the home. Of this number, about 40 took place in public or industrial garages, fac-

*Reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Company, October, 1954.

tories, mines, and similar sites. Automobile exhaust fumes were the leading cause of fatalities, with a wide variety of other gases, including carbon tetrachloride vapor, accounting for the remainder of the deaths in this group. An appreciable number of the 90 deaths occurred when persons were overcome by fumes from a running motor in a car or truck parked on the street or highway. A few of the insured died from faulty gas heaters in tourist cabins which had all windows and doors closed.

The circumstances under which deaths from accidental gas poisoning occur make it clear that the loss of life from this cause can be greatly reduced—a fact underscored by the safe use of gas appliances by millions of families in our country. Much could be accomplished by simple precautions, such as proper installation and maintenance of gas stoves and heating appliances. Similarly, emphasis must be placed on proper venting of other fuel burning appliances. Furthermore, many lives could be saved by avoiding various unsafe practices, such as retiring at night with gas heating appliances burning in poorly ventilated rooms, or running the motor of an automobile in garages where the doors and windows are shut.

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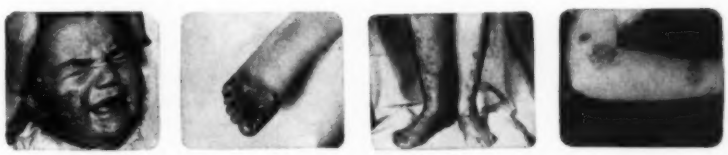

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RECORD POPULATION GROWTH IN 1954*

The country's population, including the Armed Forces overseas, rose to 163,930,000 by the end of 1954. This represents a gain of 2,830,000 during the year, the largest annual increment in our history. For eight consecutive years the increase in our population has exceeded 2½ million annually. The large population growth in 1954 resulted from a record high number of births, an all-time low death rate, and a moderate addition through immigration.

There were about 4,060,000 births during the year, or approximately 90,000 more than the year before, when the previous record high was established. The births in 1954 correspond to a rate of 25.2 per 1,000 population residing in the United States. For nine years now our birth rate has exceeded 24 per 1,000. The boom in births has added 36¾ million babies to the nation's population within the relatively short span of a decade.

The babies born in 1954 set a new mark in their ability to survive the hazards of early life. The infant mortality rate for the year dropped to a new low estimated at 26.7 per 1,000 live births. This is almost 5 percent under the previous low recorded in 1953, and one third less than the rate of a decade ago.

The general health of the population as a whole was also better in 1954 than ever before. Present indications are that the death rate dropped to 9.2 per 1,000 population. This compares with the previous minimum of 9.6 registered in 1953. In fact, 1954 was the seventh successive year in which the death rate remained below 10 per 1,000—a noteworthy record in view of the steady rise in the proportion of older people in our population.

Our population growth in recent years has resulted largely from an excess of births over deaths. During 1954, the natural increase in population amounted to the record total of nearly 2,600,000. The country also gained more than 200,000 through civilian migration during the year.

The population residing in continental United States increased by 2.0 percent in 1954; this included about 400,000 in our Armed Forces returned from overseas. Every State in the Union shared in the growth of the population. The gains, however, were not evenly distributed throughout the country. As in earlier years, the Pacific Coast States showed the largest rate of population growth during 1954, namely, 3.7 percent. This was approximately double the national rate, but well below the level experienced in the Pacific area during the 1940's. Since April 1950, California alone has added more than 2.3 million inhabitants. Its population now numbers about 12.9 million, and is exceeded only by that of New York State.

The Rocky Mountain States also experienced a vigorous population growth during 1954. In fact, Arizona and Ne-

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1. Cass, L. J. and Frederik, W. S.: Malt Soup Extract as a Bowel Content Modifier in Geriatric Constipation, Journal-Lancet, 73:414 (Oct.) 1953.

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vada have been growing at a faster rate than any other State. Each has doubled its population since 1940; Arizona now has more than 1,000,000 persons, and Nevada is rapidly approaching the quarter million mark.

Several States outside the West continue to grow at a rapid pace. Florida's population increased by 5.7 percent in 1954, and by more than 6 percent annually in the years immediately preceding. During 1954, increases somewhat above the average for the country as a whole also occurred in the District of Columbia and in six States, namely, Delaware, Maryland, Connecticut, Michigan, Louisiana, and Texas.

Although 12.3 million persons have been added to the population residing in the United States since the 1950 Census, in two States—West Virginia and New Hampshire—the out-migration of residents has offset the gains from natural increase. In New Hampshire, the population today is practically on a par with that enumerated in 1950; in West Virginia, there has been a net loss of about 56,000 persons during this period.

HOSPITALIZATION AT THE YOUNGER AGES*

During the year, one child in every 12 is admitted to a hospital and the average stay is five days, according to the experience for children of Metropolitan Life Insurance Company personnel insured under the Company's Group insurance program. The families of the office and field personnel included in this study were located in virtually all sections of the United States.† The period covered was the year from August 1953 through July 1954.

Among these insured children, who were 18 years of age and under, there were approximately three hospital expense claims paid on boys for every two paid on girls. The age distribution of cases, nevertheless, was similar for both sexes. Three fourths of the children hospitalized were under age 10, with an equal number at ages under 5 years and at ages 5 to 9 years. The children hospitalized for surgical treatment were somewhat older on the average than those admitted for nonsurgical treatment of injury or disease.

For the group as a whole, the average stay in the hospital was five days; for the girls it was 5.4 days and for the boys 4.7 days. For surgical cases in each sex the average stay was 3.6 days, whereas for nonsurgical cases it was 7.7 days for boys and 10.0 days for girls. Children at ages 5-9 had the shortest period of hospitalization and those at ages 15-18 the longest.

Surgery, including the treatment of fractures and dislocations, was performed

*Reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Company, October, 1954.
†Does not include personnel in Pacific Coast States.

on 70 percent of the children hospitalized in this experience. Tonsillectomies and adenoidectomies accounted for somewhat over half of all the surgical cases. Children admitted for such operations stayed in the hospital only a short time, three quarters of them remaining only one day. Most of the tonsillectomies were performed on children 3-7 years of age, with five years being the most common single age. The spring was the favored time of year for these operations, few of them being performed during the poliomyelitis season.

Appendectomies ranked second on the list of surgical procedures, accounting for 10 percent of the number of operations but for 17 percent of the days of hospital care. For individual cases the length of hospital stay averaged 6.2 days. Two fifths of the appendectomies were on children at ages 10-14 years, and one fifth on those 15-18 years old,

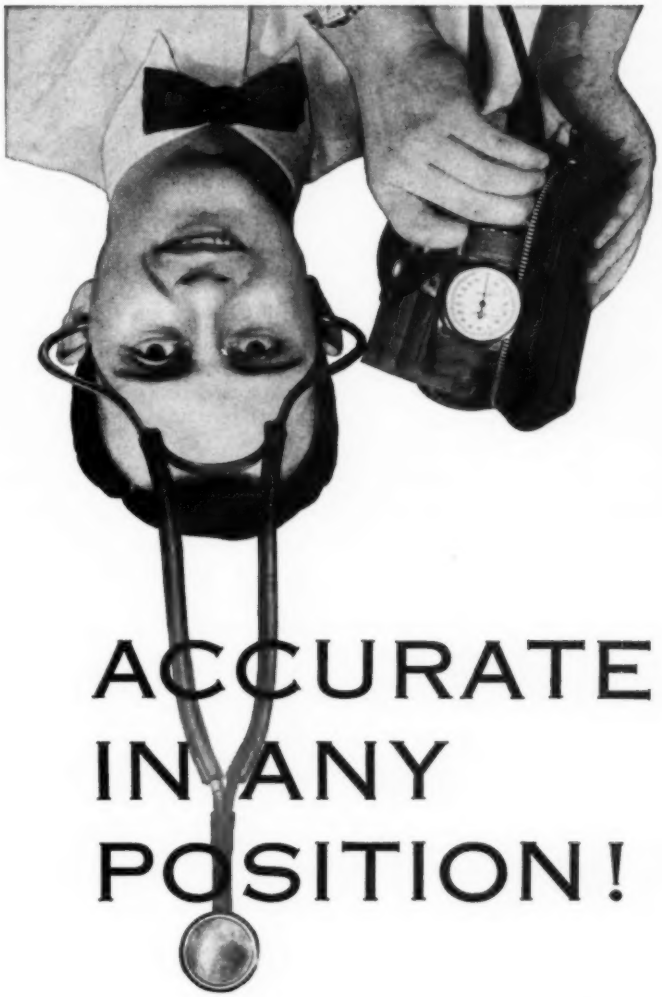
Next in order among the surgical procedures in this experience were treatment of fractures, herniotomies, and removal of benign tumors or cysts. The last-named group included 43 cases, with an average hospital stay of about five and one-half days. In addition, there were four operations for malignant tumors, the period of hospitalization varying from two days for a skin tumor to 128 days for a metastatic cancer of the bone. The average hospital stay for these four cases was 42 days.

Other leading types of surgery in order of frequency were operations on the eye, circumcisions (after 14 days of age), orthopedic surgery, suturing, and surgical repair.

Somewhat under one third of the children hospitalized in this insurance experience were confined because of disease or nonsurgical treatment of injuries. Diseases of the respiratory system headed this list, accounting for nearly three out of every 10 nonsurgical cases. Pneumonia and influenza were the most common diagnoses; tonsillitis was responsible for an appreciable number of additional cases. Almost two thirds of the children hospitalized for diseases of the respiratory system were under 5 years of age.

About one eighth of the nonsurgical cases in this experience were treated for accidental injuries. The principal types of mishaps, in order of frequency, were head injuries, poisoning, contusions, lacerations, and sprains or strains. For boys, the cases were distributed fairly evenly over the entire range of ages, but for girls they were largely concentrated at the preschool ages. Altogether, there were twice as many claims for hospital treatment of accidental injuries among boys as among girls.

Among the other leading causes of hospitalized illness requiring nonsurgical treatment, the average duration of hospital stay was above average for congenital malformation and diseases peculiar to early infancy, for diseases of the central nervous system, and for rheumatic fever.



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ESSENTIALS OF MEDICINE. The Art and Science of Medical Nursing. By Charles Phillips Emerson, Jr., A.B., M.D., Associate Professor of Medicine, Boston University School of Medicine; Member, Robert Dawson Evans Memorial Laboratory; Visiting Physician and Director of Clinical Laboratories, Hematology Clinic and Radioisotope Division, Massachusetts Memorial Hospitals; Consultant in Hematology, U. S. Public Health Service Hospital, Brighton, and Attending Physician, Veterans Administration Hospital, Boston; and Jane Sherburn Bragdon, R.N., B.S., Associate Director, School of Nursing, Massachusetts Memorial Hospitals, and Clinical Assistant in Medical and Surgical Nursing, Boston University School of Nursing. Ed. 17. Cloth. Pp. 922, with illustrations. Price $4.75. J. B. Lippincott Company, East Washington Square, Philadelphia 5, 1955.

DISEASES AFFECTING THE VULVA. By Elizabeth Hunt, B.A., M.D., Ch.B. (Liverp.), Honorary Consultant Dermatologist, South London Hospital for Women; Honorary Consultant Dermatologist, New Sussex Hospital for Women and Children, Brighton; Temporarily Honorary Dermatologist, Royal Infirmary, Liverpool; Formerly Senior Medical Officer, Radium Institute and Hospital for Skin and Cancer Diseases, Liverpool; Acting Honorary Dermatologist, Royal Sussex County Hospital, Brighton. Ed. 4, revised. Cloth. Pp. 236, with illustrations. Price $9.00. The C. V. Mosby Co., 3207 Washington Blvd., St. Louis 3, 1954.

PULMONARY DISEASES. Edited by Roscoe L. Pullen, A.B., M.D., F.A.C.P., Professor of Medicine and Dean, University of Missouri School of Medicine, Columbia, Missouri; Consultant to the Surgeon General, Department of the Army, Washington, D. C. Cloth. Pp. 669, with illustrations. Price $15.00. Lea & Febiger, Washington Square, Philadelphia 6, 1955.

DIABETES MELLITUS. Objectives and Methods of Treatment. By Henry T. Ricketts, M.D., Professor of Medicine, University of Chicago, The School of Medicine, Chicago, Illinois. Paper. Pp. 123, with illustrations. Price $3.25. Charles C Thomas, Publisher, 301-327 East Lawrence Ave., Springfield, Ill., 1955.

OPERATIVE ORTHOPEDIC CLINICS. By Lewis Cozen, M.D., F.A.C.S., Assistant Professor of Orthopedic Surgery, College of Medical Evangelists, Los Angeles; Staff, Orthopedic Hospital, Wadsworth General Hospital, Veterans Administration, Los Angeles General Hospital, Cedars of Lebanon Hospital, Los Angeles Tuberculosis Sanitarium, Los Angeles; Consultant, United States Public Health Service; Member, American Academy of Orthopedic Surgeons; and Alvia Brockway, M.D., Chief of Staff, Orthopedic Hospital, Los Angeles; Attending Staff, California Hospital, Los Angeles; Orthopedic Consultant, Department of

Public Health, State of California; Member, American Academy of Orthopedic Surgeons; in collaboration with Paul E. McMaster, M.D., F.A.C.S., Clinical Professor and Acting Head of Department of Orthopedic Surgery, University of California at Los Angeles Medical School; Senior Consultant in Orthopedic Surgery, U. S. Veterans Hospital, West Los Angeles; Attending Orthopedic Surgeon, Hospital of the Good Samaritan, Children's Hospital, Cedars of Lebanon Hospital, Hollywood Presbyterian Hospital and St. John's Hospital; Orthopedic Consultant to Harbor General Hospital; Member, American Orthopedic Association and American Academy of Orthopedic Surgeons. Cloth. Pp. 329, with illustrations. Price $10.00. J. B. Lippincott Company, East Washington Square, Philadelphia 5, 1955.

FINANCING HOSPITAL CARE IN THE UNITED STATES. PREPAYMENT AND THE COMMUNITY. (Vol. 2). Edited by Harry Becker. Cloth. Pp. 356, with illustrations. Price $4.50. McGraw-Hill Book Co., The Blakiston Division, 330 W. 42nd St., New York 36, 1955.

REGIONAL ALLERGY OF THE UNITED STATES, CANADA, MEXICO AND CUBA. Edited by Max Samter, M.D., Chief, Allergy Clinic, Research and Educational Hospitals, University of Illinois; Associate Professor of Medicine, University of Illinois College of Medicine, Chicago, Illinois; and Oren C. Durham, Lecturer in Allergy, with Rank of Assistant Professor, University of Illinois College of Medicine, Chicago, Illinois; Chief Botanist, Abbott Laboratories, North Chicago, Illinois. Cloth. Pp. 395, with illustrations. Price $8.50. Charles C Thomas, Publisher, 301-327 East Lawrence Ave., Springfield, Ill., 1955.

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NORMAL LABOR. By Leroy A. Calkins, M.D., Ph.D., Professor and Head of the Department of Obstetrics and Gynecology, University of Kansas Medical Center, Kansas City, Kansas. Paper. Pp. 128, with illustrations. Price $4.00. Charles C Thomas, Publisher, 301-327 East Lawrence Ave., Springfield, Ill., 1955.

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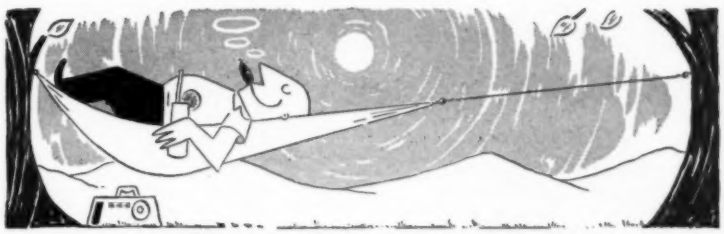

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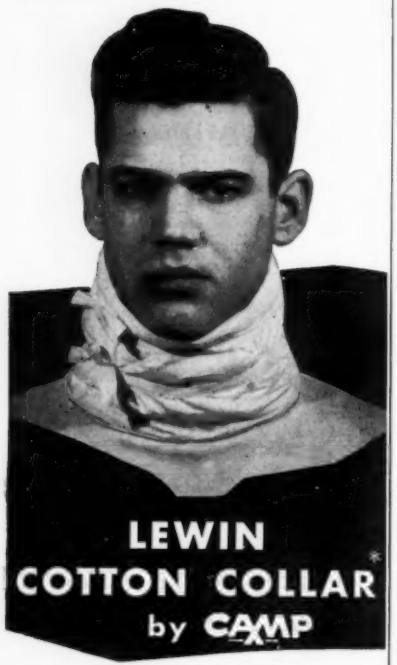

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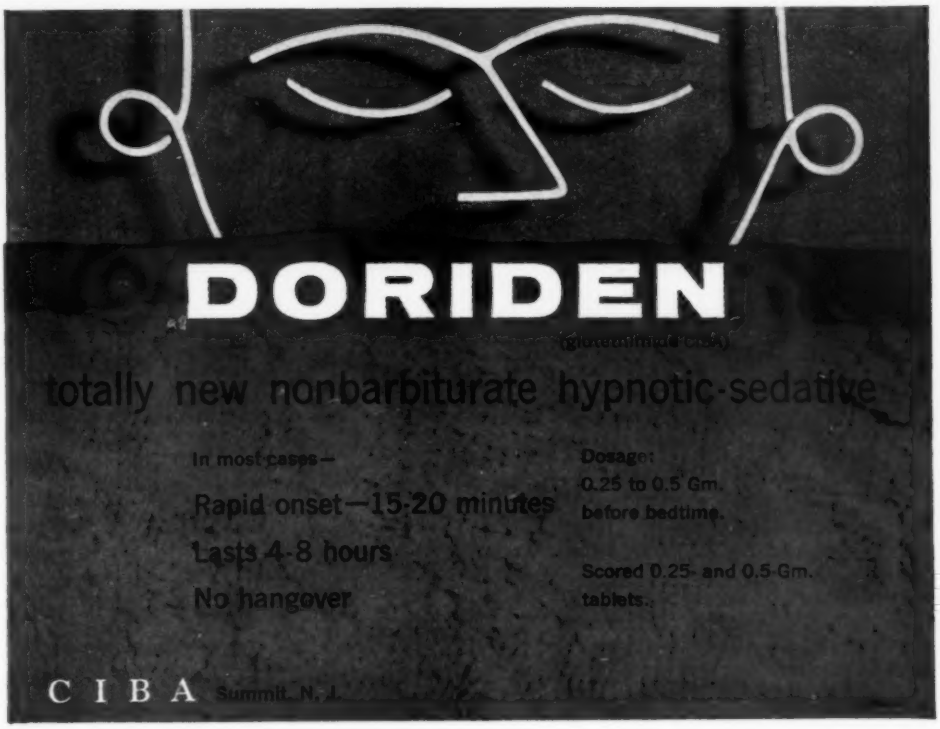

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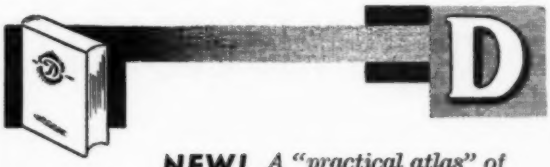

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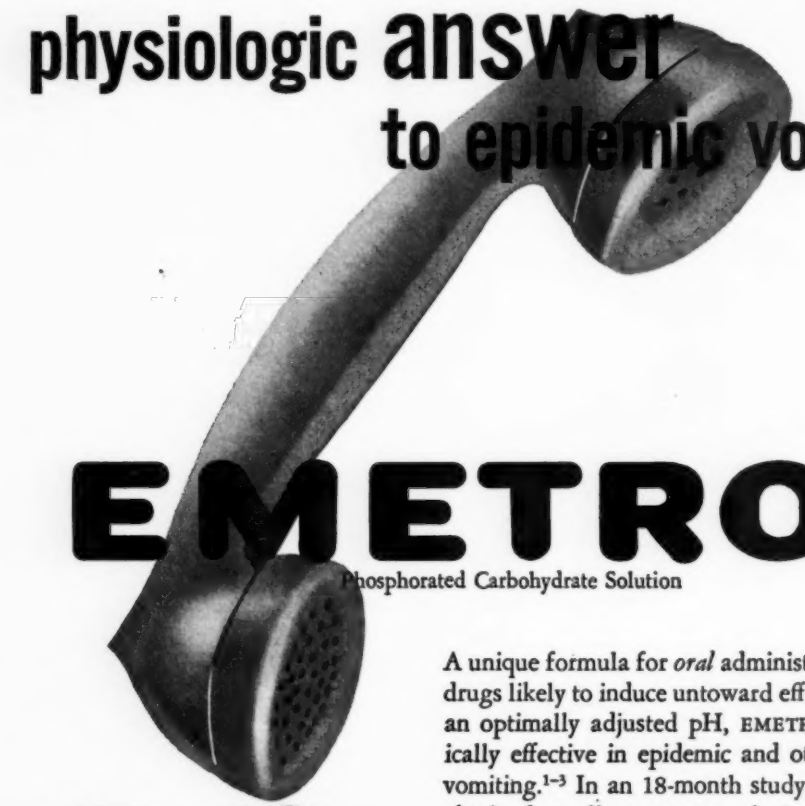

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1. Bradley, J. E., et al.: J. Pediat. 38:41, 1951. 2. Crunden, A. B., Jr., and Davis, W. A.: Am. J. Obst. & Gynec. 65:311, 1953. 3. Tebrock, H. E., and Fisher, M. M.: M. Times 82:271, 1954.

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*Steinbler, A., in Stieglitz, E. J.: Geriatric Medicine, ed. 2, Philadelphia, W. B. Saunders Company, 1949, p. 693.

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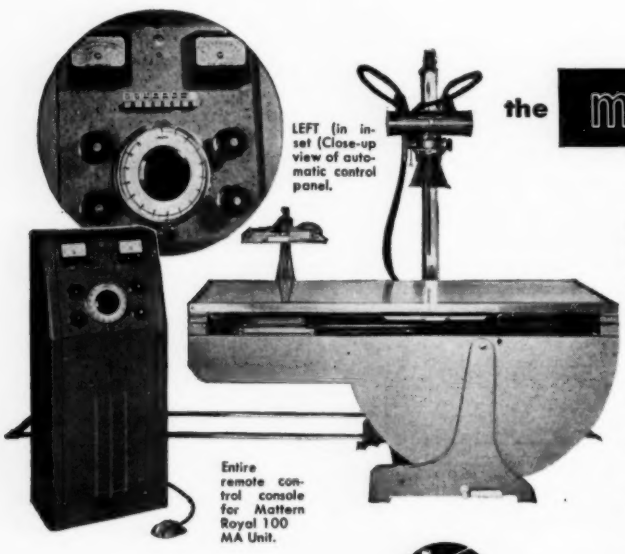

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1. Oberman, J. W., and Burke, F. G.: M. Ann. District of Columbia, 23:483, 1954.

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